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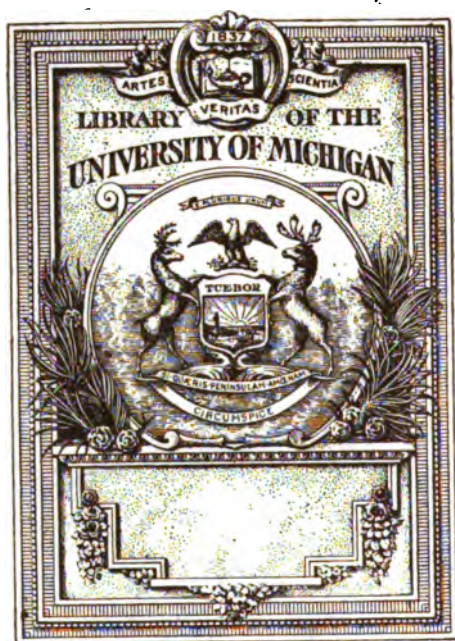
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**U. S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS**

ROYAL MEEKER, Commissioner

**BULLETIN OF THE UNITED STATES } . . . { WHOLE
BUREAU OF LABOR STATISTICS } . . . { NUMBER 199**

VOCATIONAL EDUCATION SERIES: No. 1

**VOCATIONAL EDUCATION SUR-
VEY OF MINNEAPOLIS, MINN.**

**MADE BY THE NATIONAL SOCIETY FOR THE
PROMOTION OF INDUSTRIAL EDUCATION**

*National Society for the Promotion
of Industrial Education*



DECEMBER, 1916

**WASHINGTON
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1. The first part of the paper discusses the importance of the study and the objectives of the research. It also provides a brief overview of the literature review and the methodology used in the study.

2. The second part of the paper presents the results of the study. It includes a detailed analysis of the data collected and the findings of the research. The results are presented in a clear and concise manner, with appropriate use of tables and figures.

3. The third part of the paper discusses the implications of the study and the conclusions drawn from the research. It also provides a brief summary of the key findings and the overall contribution of the study to the field.

4. The fourth part of the paper provides a brief conclusion and a final statement on the importance of the study. It also includes a list of references and a list of figures and tables.

5. The fifth part of the paper provides a brief conclusion and a final statement on the importance of the study. It also includes a list of references and a list of figures and tables.

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BULLETIN OF THE U. S. BUREAU OF LABOR STATISTICS.

WHOLE NO. 199.

WASHINGTON.

DECEMBER, 1916.

VOCATIONAL EDUCATION SURVEY OF MINNEAPOLIS, MINN.

MADE BY THE NATIONAL SOCIETY FOR THE
PROMOTION OF INDUSTRIAL EDUCATION.

PREFACE.

This bulletin is a revised edition of the report of the Minneapolis Survey for Vocational Education. The demand for this report was so great that the original edition was soon exhausted. The survey committee desired the United States Bureau of Labor Statistics to reprint the report as a bulletin of the bureau. After consultation, it was decided that it would be best to revise the text thoroughly, cutting out needless repetition and condensing the matter as much as possible. The revisions made in the bureau were submitted to Prof. C. R. Richards, chairman of the survey committee, and Mr. C. A. Prosser, director of the survey. They have approved these revisions and have made additional changes, so that the report as it now stands is the finished result of the survey.

The Minneapolis survey followed the general plan of the vocational education survey of Richmond, Va. While both these surveys were made primarily for the purposes of analyzing the local industries and the local systems of education and of ascertaining what kind of instruction is needed and the best way of imparting that instruction, they are also of nation-wide interest and significance. The facts disclosed in the studies of the industries of Richmond and Minneapolis are in general the facts peculiar to those same industries throughout the country. The methods suggested for dealing with the local school and industrial conditions in these two cities will be helpful to communities everywhere. It is to give the findings of these two city surveys wider publicity that they have been published as bulletins of this bureau.

It will be noted that this bulletin is No. 1 in a new series entitled "Vocational Education." Although vocational education appears for the first time among the titles of the different series of bulletins issued by the Bureau of Labor Statistics, this signifies no

new departure in the activities of the bureau. By consulting the list of publications on vocational education, which is given on the inside of the front cover of this bulletin, it will be seen that as long ago as 1892 the Eighth Annual Report of the Bureau, entitled "Industrial Education," was devoted to this subject. All told, 3 annual reports and 10 bulletins devoted wholly or in part to vocational education have been issued by this bureau. Nor does this list comprise all the material on this subject that has been published by the bureau. For a complete list the reader is referred to Bulletin 174, Subject Index of the Publications of the Bureau of Labor Statistics, up to May 1, 1915, under the titles "Industrial Education" and "Vocational Education." From this list of publications it will be seen that one of the most important activities of the Bureau of Labor Statistics has been the gathering and compiling of information regarding vocational education. This activity is in keeping with the intent and purpose of the law creating the bureau, which charges the commissioner with the duty of collecting information upon the subject of labor, its relation to capital, the hours of labor, and the earnings of laboring men and women, and the means of promoting their material, social, intellectual, and moral prosperity." One of the most important means of promoting the material, social, intellectual, and moral well-being of laboring men and women is a proper educational system. A thorough knowledge of industrial processes and industrial conditions is necessary for the intelligent analysis of any system of industrial training designed to fit youth for places in industry. The Bureau of Labor Statistics has been able to make intelligent studies of industrial education because it is obliged to know the occupations in industry, the conditions in the labor market, and the attitude of the laboring people toward training for vocations. Industrial education, whether carried on in school, in shop, or in factory, is a matter with which the Bureau of Labor Statistics must keep in touch because of the effects of such education upon the wages and the welfare of the workers.

The great and increasing importance of vocational education makes it advisable to devote a special series of bulletins to that subject. While the Bureau of Labor Statistics is concerned but little with vocational education outside the field of industrial training, it was thought best to use the title "Vocational Education" to designate the new series, because several reports dealing with the broader aspects of vocational education have already been published by the bureau, and this bulletin is much too broad in scope to be labeled a study in industrial education.

ROYAL MEEKER,
Commissioner of Labor Statistics.

CHAPTER I.

WHY THE SURVEY?¹

Minneapolis has long been interested in vocational education. Seven years ago the Schoolmasters' Club made a report on the subject. Special committees from the board of education have visited various places to learn what other cities and States were doing. In 1912 the Minneapolis Teachers' Club issued a report with recommendations as to the need for vocational education, which created much favorable sentiment and furnished helpful data for this report.

Two years ago the board of education created a special committee on vocational education made up in about equal numbers of educators, business men, employers and employees engaged in industry, representatives of women's clubs, and social workers. This committee with a few additions has served also as the local committee for the direction of this survey and report.

The public schools of the city already have made commendable progress in the establishment of vocational courses. Their work has been supplemented in various ways by the University of Minnesota, the William Hood Dunwoody Industrial Institute, and numerous other agencies of a semipublic or private character.

Various recent events and conditions led to the present survey. Ten years ago Minnesota raised the age to 16 years in its compulsory education law; but, on account of numerous exceptions allowed by the law, many children went to work under 16. Successive legislatures removed these exceptions until practically all children must now attend school until 16 years old, unless they have completed the work of the elementary school. This, with the increasing emphasis on enforcement of the law, has forced into the schools many pupils demanding vocational instruction.

The enactment by the 1913 legislature of a law, now before the courts, providing for a commission to determine the minimum wage for girls and women has brought a demand for increased efficiency that only adequate training can supply.

By the will of the late Mr. William Hood Dunwoody a trust fund of over \$3,000,000, which has been increased since the beginning of the survey to about \$5,000,000 by the will of his wife, Mrs. Kate L. Dun-

¹ All statements in this report, unless otherwise specifically designated, are made as of Sept. 1, 1915, the date when the field work of the survey closed.

woody, was created to give free instruction in industrial and mechanical arts to the youth of Minneapolis and Minnesota.

Before undertaking to put into effect the provisions of the will, the trustees of the fund desired more information as to the kind of vocational education most needed and advice as to the best ways by which the school could cooperate with other educational agencies and institutions of the city and State.

Because of this large fund dedicated to the promotion of industrial education, the survey has been, and the resulting recommendations are, different from what would have obtained in a city where the work was entirely dependent upon public taxation and where there was an absence of the willingness and eagerness of all agencies to cooperate so strongly manifested in Minneapolis.

The rapid growth of the city has called for the expenditure in the past of practically all the available funds for general education. Since the city could not afford costly experiments, the board of education wisely had postponed action until more funds were available and further developments had been made in vocational education generally. Mr. Dunwoody's gift furnished the necessary funds to meet a part at least of the expense for industrial education and made necessary a study which should define the activities of the public schools and of the Dunwoody Institute.

As the time was ripe for action, the superintendent of schools with the board of education and the trustees of the Dunwoody Institute enlisted the cooperation of other local agencies in bringing the National Society for the Promotion of Industrial Education to Minneapolis to make this survey and hold its annual convention.

ORGANIZATION.

The executive committee of the National Society, on April 1, 1915, made a written agreement with the Minneapolis authorities covering all the arrangements for the survey and convention. This agreement, given in full in Appendix B, provided that, in return for the financial support of the survey and of the convention, the society should conduct in advance a study of the city of Minneapolis for purposes of industrial education, which study should terminate in a report with recommendations; and that the latter should be submitted to the ninth annual convention of the society to be held in Minneapolis in January, 1916. The executive committee appointed a general survey committee and adopted a plan for the survey, given in Appendix B.

The general survey committee, in immediate charge of the survey, consisted of six members, four of whom were members of the National Society and two residents of Minneapolis, one the superintendent of schools and the other the chairman of the local survey committee.

This committee took the month of April to plan the survey. All the arrangements made have been carried out substantially as planned and as approved by the executive committee.

A director was appointed, the study was outlined, schedules to be used by field workers were drawn up, and those for industrial establishments tested in a factory near New York City. The detailed plans of the director were submitted and finally approved.

A local survey committee of 18 residents of Minneapolis was appointed by the general survey committee to assist in the work; their names appear in Appendix A. The plans for the study were approved by the local committee also. During the survey meetings were held and reports made as to progress and difficulties. Not the least valuable of the many contributions of this committee were the cordial support and the aid given by the committee as a whole and by individual members in bringing about a favorable attitude on the part of many different interests in the city.

The field work began May 1, 1915, and was completed about September 1, 1915. The general survey committee had a joint conference with the local survey committee November 5 and 6, at which the findings of the various studies were carefully considered and tentative recommendations formulated. A month later (Dec. 3-10, 1915) the general survey committee met in New York City and completed its recommendations based on the survey as they appear in the various chapters. The report went to press December 20. It was distributed to citizens of Minneapolis and to members of the National Society about January 1, 1916, and submitted to the ninth annual convention of the society in Minneapolis January 20 to 22, 1916, inclusive.

Many different agencies cooperated in making the survey. The expenses, about \$8,000, were met by the board of education, the William Hood Dunwoody Institute, the University of Minnesota, and the Woman's Club. In various ways service worth at least \$8,000 was contributed without cost. The board of education assigned to the work a considerable part of the time of three employees of its attendance and vocational guidance department and of the director of its manual training work.

The trustees of the Dunwoody Institute gave the paid services of the principal and teachers for six weeks during the summer and also supplied some clerical work. The University of Minnesota furnished a specialist in home economics from its agricultural extension division, and a dozen students from the home-economics department volunteered their services. The university also supplied summer students from the classes in economics to assist as volunteers in the study of commercial education, which was almost entirely financed by the research fund of the Graduate School of the university.

The Minneapolis Public Library catalogued the collection of books gathered for the survey and did considerable typewriting. Just previous to this survey the Minneapolis Civic and Commerce Association had finished a study of the industries of the city, from which valuable data were obtained, and officers and employees of the association gave freely of their time and advice.

The Minnesota Department of Labor and Industries not only helped with information already gathered, but made for the survey as well as for its own reports special studies described later. The total value of this service exceeded \$1,000.

Everywhere the survey met with the hearty support of business men, social workers, workingmen, and educators. No one who was asked refused to serve on any of the numerous advisory committees. Special acknowledgment is due to employers and employees who met frequently and willingly with the staff of the survey and furnished valuable information as to conditions in each trade and kind of training needed.

It has been impossible to give credit in detail to all those who contributed to the work. A statement of the personnel of all the forces will be found in Appendix A.

SEPARATE PROBLEMS STUDIED.

The survey consisted of a series of separate studies of different problems, each organized under a special committee or person. Where a special committee had charge the actual study was made under the direction of one responsible person.

A special committee on commercial education, whose membership is given in Appendix A, had entire charge of the study of that subject. Its work was organized under a member of the staff of the survey employed by the research fund of the Graduate School of the university to make the study for the department of economics. This investigation was carried on in close cooperation with other studies. The report on findings for commercial education appears in the section of Chapter III on commercial courses in the public schools, in the section of Chapter IV on the private commercial schools, and in Chapter XXI on what vocational education is needed for office work; the recommendations of the committee on commercial education appear at the close of the findings on the commercial courses in the public schools in Chapter III.

The study of vocational education for home workers, presented in Chapter XXII, was in charge of a special committee of representative women from a wide variety of interested organizations. The work was organized under a specialist in home economics from the university agricultural extension division and a corps of volunteer workers. The names of the committee and staff are given in Appendix A.

The findings on manual training were submitted to a special committee made up of western men of experience and prominence in the work, whose names are given in Appendix A. The committee met in Chicago in September, 1915, and after careful consideration approved the findings and made the recommendations shown in Chapter III (see p. 51).

The investigations of correspondence schools and of apprenticeship were made at the request of the survey by the Minnesota Department of Labor, whose staff organization is given in Appendix A. The study of correspondence schools appears in Chapter IV (see p. 112), and of apprenticeship in Chapter V.

All the other studies were made directly under the general survey committee, represented by the director of the survey. A staff was organized which included every person having charge of any study and those in charge of special studies under special committees. The general office force helped with all the studies, but the field workers for each constituted separate groups under the direction of some member of the staff, which during the first four months of the survey held weekly meetings with the director.

THE AIMS.

The aims of the survey have been: (1) To get the facts about the schools and vocations of Minneapolis necessary in any intelligent planning of a program of vocational education; (2) to make recommendations as to a program for such education in Minneapolis which, after consideration of the facts, the best judgment of these vocations and of the general and local survey committees approved; (3) to obtain the cooperation of every interested agency in carrying out a comprehensive program of vocational training; (4) to make the survey and its recommendations the subject of much of the discussion at the annual convention of the National Society in Minneapolis, so that the convention may be of the largest possible benefit to the city; (5) to make a type study for vocational education which may be of benefit to other cities.

METHOD.

The ways in which information was gathered are explained fully in Appendix B. Only a brief reference to some of the main features of the method used is here given.

Duplication of effort and needless expense were avoided by gathering carefully at the outset all available data. All pertinent facts from these data have been used. The scope of the investigation was determined by a study of the United States Census reports on occupations for 1910. Maps of the city for separate industries pre-

pared by the Civic and Commerce Association's survey for 1914 proved most helpful to field workers. Many of the tables, charts, graphs, and other statistical material used were supplied by the association survey. The vocational education survey made by the Minneapolis Teachers' Club in 1912 supplied significant facts as to school and industrial conditions. The State department of labor furnished much valuable statistical material and information as to names of employers, location of plants, products made, numbers employed, hours of labor, and conditions of work.

Individual schedules were used to some extent, though probably less than in most studies of a similar character. On the whole, most of the studies can not be said to represent a statistical investigation, as personal visits and continued conferences furnished most of the data. The figures employed supplement rather than furnish the basic information for most of the chapters.

Individual schedules for workmen were used by the State department of labor in the study of correspondence schools. Schedules to be filled out by employers and by unions furnished some information for the chapter on apprenticeship. In the chapters on commercial education and the home worker the individual schedule was relied on more than in any other studies. Blanks were used to get information from all private as well as public schools upon which a report is made. In the investigation of the need of art education in industry, a preliminary questionnaire was sent to employers to get facts and opinions as a basis for further inquiry by field workers.

Personal observation and interviews were the means most largely employed in investigating the 36 specific industries and occupations considered. Field workers visited typical plants, gathering facts and opinions bearing upon 26 different points carefully drafted in advance by the general survey committee. This chart is explained more fully in Appendix B. Each worker prepared a tentative report on the industry or occupation studied, which, after having been edited by the office, was submitted for correction to a conference of representatives of the industry. These findings as they appear represent statements approved by the industry or occupation.

Conferences with representative employers and employees furnished not only data as to conditions and needs of each trade, but also the opinions and attitudes of both employers and employees as to the best way to meet the demand for better training. Additional and detailed facts about the trades were obtained through stenographic interviews with journeymen.

At the first conference for each trade the information concerning it gathered by the Richmond survey was compared with conditions in Minneapolis and points of similarity and difference noted.

In succeeding conferences the conditions of apprenticeship were investigated and its shortcomings determined. Feasible plans for meeting these shortcomings were proposed and discussed. Courses of study were formulated, based upon the needs of the trade. Finally tentative trade understandings, agreeable to all the representatives at the conferences, whereby these courses might be best given, were written and submitted to organizations of employers and employees for adoption.

All the facts and recommendations resulting from these interviews and conferences have been submitted to representatives of both employers and employees before being published in this report. Therefore in the form in which they appear these statements about the trades have been confirmed and approved by the trades.

Information concerning the public and private schools was obtained through personal interviews with teachers and officials as well as through use of the questionnaire. Findings concerning each school have been referred to responsible school officers for correction and approval. Thus all statements in regard to schools and industries have been checked carefully by those having vital concern in and most knowledge of each. They therefore constitute a most accurate representation of the local situation.

CHAPTER II.

TO WHAT EXTENT IS THERE A NEED FOR VOCATIONAL EDUCATION IN MINNEAPOLIS?

This report recognizes at the outset the necessity of general education as a preparation for all work. This is what is meant by the saying that education will help a man even to dig a ditch better. "It is clearly recognized not only that a stronger vocational element is needed in general education but that no vocational school is worthy the name which fails to give a considerable amount of general education along with special preparation for a vocation."

The survey is concerned, however, only with education which fits directly for the successful pursuit of some useful occupation. At least five different kinds of vocational education are commonly recognized: That which fits directly for such pursuits as law, medicine, engineering, or dentistry, is professional education; that which prepares for seagoing is nautical education; that which trains for tillage of the soil, care and marketing of crops, animal husbandry, forestry, and other related subjects is agricultural education; that which fits for business and commercial pursuits is commercial education; that which prepares for efficient wage earning in the trades and industries is industrial education.

Professional education at public expense already has been generously provided for in Minnesota. Obviously there is no need for nautical training. The city of Minneapolis is interested directly in agricultural education in so far as facilities for training in home gardening and elementary agriculture are concerned. Hence the report gives a brief chapter to the subject. In accord with the report of the Commission on National Aid to Vocational Education the survey is of the opinion "that preparation for the varied duties of the home should be regarded as a legitimate and integral part of the education of every girl; that it should be given both in elementary and high schools; and that it should be considered a necessary part of a girl's general preparation for life, no matter what her particular calling might be."

Because of the deep interest in this phase of practical education a study on the "Extension training of workers already engaged in the home" made by a specialist in home economics of the Agricultural Extension Division of the University of Minnesota, has

been incorporated. Certain facts regarding the home-economics work of the public schools are also given.

Believing this an opportune time for a study of commercial education in connection with the survey, the authorities of the University of Minnesota volunteered to undertake, through the research department, an investigation of the subject. A chapter is given to this. Thirteen chapters deal specifically with industrial education.

Minneapolis has the same general need for vocational training as all other parts of the country. Perhaps no stronger reasons for a widening program of vocational education for the whole country have been stated than those given by the Commission on National Aid to Vocational Education (1915). The two great assets of a nation which enter into the production of wealth are natural resources and human labor. The conservation and full utilization of these depend upon vocational training. Vocational training is required to conserve and develop natural resources, prevent waste of human labor, supplement apprenticeship, increase wage-earning power, meet the increasing demand for trained workmen, and offset increased cost of living. It is therefore a wise business investment. To provide it for all our workers is a patriotic duty, since already our commercial supremacy abroad and our prosperity at home are at stake.

The social and educational need for practical education is equally urgent. We should have it to democratize the education of the country by recognizing different interests and abilities, giving equal opportunity to all to prepare for their life work, and extending education through part-time, continuation, and evening instruction. We need vocational education for its indirect but positive effect on the aims and methods of general education: (1) By developing a better teaching process by which children who do not respond to book instruction alone may be reached and educated through learning by doing; and (2) by making utility take its place in dignity by the side of culture and connecting education with life by making it more purposeful and useful.

Higher standards of living, which make for increased efficiency, are a direct result of better education. Out of the industrial and social unrest comes a demand for a more practical education that shall furnish opportunity for creative expression, save the worker from the narrowing influence of specialized tasks, fit him to progress in industry, and enable him to rise to ranks of leadership and responsibility.

In many lines Minneapolis presents a large field for industrial and commercial education. According to the United States Census for 1909 the value of the annual per capita output of employees in its manufacturing lines exceeds that of any other city in the

country, if not in the world, being \$4,880. This is also true as to the per capita output for its wage earners, which is \$6,140. Minneapolis stands second among all the large cities of the country in the value added to the raw product by manufacture for each wage earner, \$2,110.

The industrial census taken by the Civic and Commerce Association shows that in 1914 there were 1,431 manufacturing establishments having a total of 41,052 employees. Of these, 6,764 were salaried employees and firm members and 34,288 wage earners, 28,205 males and 6,083 females. One hundred and twenty-three lines of industries were represented, of which six employed more than half (20,805) of all the persons engaged in manufacture.

These were, in the order of product value, flour and grist mills, lumber and timber, foundry and machine shops, printing, car construction and repair, and baking; and, in the order of number of employees, foundry and machine shops, flour and grist mills, lumber and timber, printing, car construction and repair, and baking. These six lines covered 577 establishments. Their combined output had a value of \$111,811,000, the total value of all manufactured products having been \$165,405,000.

The rapid growth of manufacturing in Minneapolis has created a corresponding demand for more workers, as shown by the accompanying table. The figures for 1909 were taken from the United States Census of Manufactures for 1909; those for 1914 were gathered by the Civic and Commerce Association.

TABLE 1.—NUMBER OF MANUFACTURING ESTABLISHMENTS IN MINNEAPOLIS AND OF PERSONS EMPLOYED THEREIN, 1909 AND 1914, BY INDUSTRIES.

Industry.	Number of establishments.		Number of employees.	
	1909	1914	1909	1914
Foundry and machine shops.....	95	102	3,254	5,124
Flour and grist mills.....	13	22	3,594	4,264
Lumber and timber.....	34	41	5,262	3,363
Printing and publishing.....	216	253	3,160	3,313
Car construction and repair.....	3	6	2,683	2,923
Bread and bakery products.....	100	153	1,156	1,818
Clothing.....	17	20	924	1,047
Furniture and refrigerators.....	23	21	908	977
Malt liquors.....	4	4	428	714
Copper, tin, and sheet metal.....	47	75	472	689
Cooperage and wooden goods.....	16	17	584	579
Leather goods.....	14	29	331	522
Confectionery.....	12	19	452	446
Paper goods.....	5	6	105	427
Artificial stone.....	28	41	226	371
Patent medicines and druggists' preparations.....	52	62	583	356
Marble and stone.....	10	17	318	355
Tobacco manufactures.....	45	52	414	348
Fur goods.....	17	17	195	294
Electrical machinery.....	8	13	149	276
Carriages and wagons.....	23	23	264	258
Photo-engraving.....	5	10	139	214
Brick and tile.....	9	8	148	129
Jewelry.....	8	13	104	120
All other industries.....	298	407	8,070	11,285
Total.....	1,102	1,431	33,923	41,052

¹ In original report total is given as 41,052.

The field of vocational education is perhaps best shown by the number of workers employed in different lines. According to the United States Census on Occupations, 1910, the following are the occupational groups in descending order of number of workers:

TABLE 2.—PERSONS ENGAGED IN SPECIFIED OCCUPATION GROUPS IN CITY OF MINNEAPOLIS.

[Source: Thirteenth United States Census, 1910, Vol. IV, pp. 166-180.]

Occupational group.	Total employees.
Manufacturing and mechanical industries.....	53,260
Trade and commerce.....	25,259
Domestic and personal service.....	19,423
Transportation.....	17,202
Clerical occupations.....	14,868
Professional service.....	8,648
Public service not elsewhere specified.....	3,686
Agriculture, forestry, and animal husbandry.....	1,978
Extraction of minerals.....	262
Total.....	143,482

The following table gives the distribution as to skilled and semi-skilled employees and laborers by sex in the manufacturing and mechanical industries:

TABLE 3.—NUMBER OF SKILLED AND SEMISKILLED EMPLOYEES AND LABORERS IN SPECIFIED MANUFACTURING AND MECHANICAL INDUSTRIES OF MINNEAPOLIS, BY SEX.

Industry.	Skilled employees.		Semiskilled employees.		Laborers.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Building trades.....	9,379	2	.....	.....	5,494	61	14,936
Metal industries.....	5,324	2	1,743	52	839	7	7,967
Clothing.....	1,226	4,792	144	134	3	.....	6,309
Supervisors and technicians.....	5,310	175	.....	.....	.....	.....	5,485
Lumber and furniture.....	1,272	15	1,379	42	1,347	10	4,085
Food and grain.....	1,031	57	851	477	613	17	3,046
Chemical and drug.....	2,405	6	76	45	272	3	2,807
Printing and engraving.....	1,184	62	294	265	9	2	1,817
Textile.....	2	.....	185	664	48	13	832
Boots and shoes and leather.....	307	2	440	121	18	4	892
Clay, glass, and stone.....	150	.....	283	4	278	1	716
Tobacco.....	.....	.....	244	99	4	2	349
Liquor and beverage.....	.....	.....	208	8	126	1	338
Jewelry.....	150	4	16	1	.....	.....	171
All other industries.....	701	20	1,110	764	821	4	3,420
Total.....	28,451	5,137	6,968	2,697	9,872	125	53,260

Outside of flour mills and car construction and repair work of the street railway company, the problem of vocational education is to provide training for a wide variety of small but growing industries, each employing a comparatively few workers.

The average number employed in the 102 foundries and machine shops is 50; in flour and grist mills, 194; in lumber and timber, 82; in printing, 13; in bread and baking, 12.

The street railway company, which employs 2,923 persons in car construction and repairing, and one of the knitting mills are the only concerns employing more than 1,600 persons each, and there are only nine manufacturing concerns employing more than 500 each. The average number of employees in all the manufacturing establishments in the city is 28.

All these establishments provide occupations calling for different kinds of training and experience. Small establishments call for broader practical training of the average worker than large ones having greater division of labor and specialization of tasks. In the specialized industry there is a need for preparing workers for new positions, and in both a need of training for advancement. The progress of Minneapolis, as in all other large cities, will depend more and more upon the development of its human resources, to keep step with the rising demands of the natural resources and the rapidly increasing population of the Northwest.

Both employers and employees agree that there is a very great need for vocational education in all the manufacturing industries covered by this survey. Like agreement was found in the building trades, in which, according to the United States Census report for 1910, 14,936 workers were employed, of whom 9,381 were in skilled occupations; in trade and commerce and in clerical occupations in which, because of the position of Minneapolis as a distributing point, a comparatively large number of persons (40,127) were employed; in transportation, in which 17,202 were employed; and in domestic and personal service, not including housewives and daughters in families, in which 19,423 were employed.

The extraordinary growth of Minneapolis has been due largely to its geographical position and the rich natural resources of that part of the country. According to the United States census its population grew from 301,408 in 1910 to 343,466 in 1914, an increase of 13.9 per cent. At the same rate for ten years the population would be 406,303.

A large gap exists between the number of workers now being trained and the number needing training. For example, the study of apprenticeship made by the survey shows only 634 apprentices in manufacturing and mechanical industries, which in 1910 employed 53,250 persons. Even in these cases no technical instruction is given, and in very few instances does the shop experience give an apprentice the proper training.

Thus far the public schools have not devoted their attention to the industrial worker. With the exception of the trade courses in the Girls' Vocational High School, recently established, and a few evening classes carried on by various agencies, the whole field of trade and technical training is yet to be developed. There are agencies

enough for giving commercial training for the ordinary office worker, but too many are private schools and require large tuition fees.

The large attendance upon these private schools shows a need for additional facilities for commercial training by the public schools. The fact that last year over 7,000 students were enrolled in private vocational courses, including correspondence courses, and paid over \$300,000 in tuition, is evidence of the demand for this instruction.

The needs of the workers in the skilled trades were felt so definitely that representatives from the trades in conference were able to suggest readily definite courses to meet them. These courses, having been approved by the respective trades, are included in the special reports for each trade. They represent concretely the ideas of the trades as to training required.

The enforcement of the minimum wage law of 1915, if the law is held constitutional, will bring immediate necessity for special training for inefficient and low-paid workers. This law empowers a State commission, after investigation, to determine the minimum wages for "women and minors of ordinary ability and also the minimum wages sufficient for living wages for learners and apprentices in any occupation where in the opinion of the commission the wages paid to one-sixth or more of the women or minors employed therein are less than living wages."

This survey is not concerned with the advisability of this law, but these facts seem to stand out: Employers feel that, if wages are to be increased by law, the increase should be accompanied by both provisions and requirements for the better training of the low-grade worker; and that, if the courts should sustain the law, steps should be taken in this direction at once.

Minneapolis has no need for compulsory schooling for the employed child under sixteen. In a number of States, notably Wisconsin, where children who have not completed the elementary school may go to work when 14 years old, laws have been passed requiring them to attend school part of their working time, usually four to eight hours a week, to get further training which will fit them for better citizenship and industrial intelligence. Minnesota, on the other hand, has chosen to withdraw these children from industry by requiring them to attend the regular schools until they are 16 or have completed the elementary school work or its equivalent. Both States through their laws have recognized that it is the duty of the schools to prepare the wage-earning child for life and for industry. They differ not in aim but in method.

The enforcement of the compulsory school attendance law, more fully described later, requiring all children to remain in school until 16

unless sooner graduated from the eighth grade retains in the Minneapolis schools hundreds of boys and girls who in most States would go to work at 14. On the theory that two additional years in school are necessary to prepare children for life and for work, the State has deprived them and their families of two years of wage earning. Parents and children may justly demand that the State guarantee them a training which will fit them to be not only intelligent citizens but intelligent and successful wage earners.

Of those who reach the second grade about 4 out of 5 never finish high school, 1 of 2 never attend high school, almost 3 out of 10 never complete the elementary school. The immensity of the problem is indicated by the fact that while 4,956 students were enrolled in the third grade in 1905-6, only 1,111 were enrolled in this same class in its senior year in high school in 1914-15; in other words, that 3,845 students had dropped out.

A clear pathway for merit of every kind, in every citizen of the community, might well be the fundamental ideal of organized society. The way should be open for the fullest expression of all the wit, energy, genius, dexterity, skill, taste, technique, and art of every man, woman, and child of every city and town and country place.

When the pathways for merit are wide open for all, the city of Minneapolis will profit a hundredfold from its most precious asset of human resources and democracy will find not only its best expression but its fullest fruition. Not until a system of vocational education has given the mechanic and the artisan, the designer and the decorator, a chance, through training, to develop their peculiar interests and abilities, can it be said that the city has opened for them a clear pathway for merit.

CHAPTER III.

TO WHAT EXTENT ARE THE PUBLIC SCHOOLS MEETING THE NEED?

The Minneapolis public schools have contributed largely to vocational efficiency by the excellent general education they furnish. General intelligence is fundamental to industrial intelligence and skill. By requiring practically all children to remain in school until 16 years old, Minnesota has insured for most of the children of Minneapolis the necessary basic preparation for labor as well as for citizenship.

ENFORCEMENT OF COMPULSORY ATTENDANCE AND CHILD LABOR LAWS.

Enforcement of the compulsory attendance and child labor laws is a large service to the future social and economic life of the city. Few children under 16 leave school to go to work. The present State law requires them to attend a public, parochial, or private school either until they are 16 or have finished the eighth grade. An employment certificate is required of all under 16 who have finished the eighth grade.

For the school year of 1907-8 the compulsory school age in Minnesota was 8 to 16 years, but pupils between these ages could leave school for any of the following reasons: (1) ill health, (2) taught at home or elsewhere in common branches, (3) already acquired such branches, (4) engaged in some useful occupation, (5) no public school within reasonable distance, (6) poverty. Employment certificates were in addition granted to those able to read or write and familiar with arithmetic through fractions, who had been instructed the previous year in reading, spelling, writing, grammar, and geography, and whom poverty compelled to leave school.

By successive changes made by the legislature practically all children over 8 years and under 16 must attend school. The only legal excuses for nonattendance are ill health, distance from school, religious holidays, and completion of the eighth grade, while employment certificates can be issued legally only to eighth-grade graduates. The improvement brought about by changes in and better enforcement of the law is best shown by the return on employment certificates for the last eight years. In 1907-8, 312 certificates were issued to nongraduates and 101 to eighth-grade graduates, a total of 413. Notwithstanding the rapid growth of the city, only 351 certificates were issued in the last school year, of which 285 were to graduates and only 66 to nongraduates.

In the former year, 3 out of every 4 of the certificates were granted to those who had not finished the elementary school, in the latter only 2 out of every 11.

In 1914-15 applications for certificates for 250 nongraduates were received. In 191 cases the reason alleged was "financial necessity," and in 59 "for the good of the child." After careful investigation 68 certificates were issued, 39 on the ground of "financial necessity" and 27 where progress had ceased and no suitable school was available. These certificates were all issued before March 8, and since that time no certificates have been issued except to eighth-grade graduates.

In September, 1915, out of 91 applications for certificates for nongraduates, 78 alleged financial necessity. No certificates were granted, but 54 applicants were referred to social agencies for aid. Since the State has required all such to stay in school until 16 years old, many persons think some means should be provided in the form of scholarships rather than poor relief to keep the pupils in school.

In all, 186 nongraduates under 16 were reported in June as having left school to go to work in the last school year. Of these, 65 received working certificates and 121 are not accounted for. A considerable number undoubtedly were 15 years old in September (the time when the school age is taken), became 16 in the course of the year, and were legally entitled to leave school. Twelve 14-year-old, twelve 13-year-old, and four 12-year-old children were reported by the principals as leaving school for work. Who these were and why they were permitted to leave school the reports do not state. Investigation has shown that there may have been some clerical errors. No figures are available showing that any left parochial schools in a similar way.

The attendance department of the public schools plans to prevent this laxity (1) by requiring that no pupil's name be dropped until the case has been investigated and withdrawal approved by the attendance department, (2) by educating teachers as to the requirements of the compulsory education law, and (3) by enlisting the cooperation of parochial schools in reporting promptly the names of children leaving. With the exceptions noted, Minneapolis is on a straight eighth-grade, 16-year-old basis, so far as compulsory education is concerned.

CHANGES IN WELFARE LAWS ADVOCATED.

Certain changes in the Minnesota child welfare laws are advocated by citizens of Minneapolis as follows:

1. A provision defining school absence so as to make possible in the future accurate records of attendance in the several districts. The New Jersey law, whose plan is now being carried out in the

Minneapolis schools by a rule of the superintendent in the absence of any legal provision, has been suggested. It reads: "A pupil is absent when not in attendance at a session of school while a member of the school. A pupil is either absent or present every day the school is in session after entering the school until the date the pupil officially leaves the school for the school year."

2. Licensing of all children between the ages of 12 and 16 years engaged in peddling, bootblacking and selling papers.

3. Requiring all children over 16 and under 18 years of age not in school or at work to obtain a "home permit" from the school authorities.

4. State aid in the form of scholarships or mothers' pensions to enable parents, under proper safeguards, to keep their children in school as long as the law requires. "Minnesota has the most rigid age and grade standards, but makes inadequate provision for maintaining them."

5. Provision giving the authorities more discretion in issuing employment certificates to children under 16 who have not completed the eighth grade. "Such discretion might well be exercised jointly by the official usually issuing the employment certificate and the local factory inspector."

6. A complete statement in the law of the evidence required from parents or guardians when birth dates of children must be established. The following is required now: Transcript of birth record; if not possible, authorized physician's certificate; if not possible, birth and baptismal certificate; if not possible, passport and immigration record, other official or religious record; if not possible, record of first schools attended in the State, with affidavit of parent.

7. Legislation permitting compulsory commitment of feeble-minded children to an institution. "Unless the feeble-minded child is guilty of some delinquency, it is possible to commit him to an institution at the present time only by a strained interpretation of the powers of discretion lodged in the judge of the juvenile court."

8. Provision for part-time schooling for children over 14 and under 16 years old. The following bill introduced into the 1914-15 session of the legislature shows the ideas of school people who believe in greater elasticity in issuing employment certificates:

"In case the board of education of any school district in cities of the State of Minnesota having over 50,000 inhabitants and not governed under a charter adopted pursuant to chapter 36, article 4, of the State constitution, shall provide and maintain part-time courses of study for children over 14 years of age, in which the plan of administration of attendance and curriculum of said courses of study shall in the judgment of the State superintendent of education provide for a substantially equal division of the time of

pupils between employment in a useful occupation requiring special training therefor and not otherwise forbidden by law, and formal study in the school for a period of not less than 50 hours in any one month of subjects related to such occupations, nothing in existing laws relating to the issuance of employment certificates shall be construed to prevent the issuance of an employment certificate for any child attending said school."

The schools are beginning to meet the problems of vocational guidance and placement by the recent establishment of a department of school attendance and vocational guidance which has cooperated closely with this survey and report. The information concerning trades and occupations gathered will be immediately available for its work. Much of it will be published in separate pamphlets for distribution among the youth of the city.

Because of the enforcement of attendance laws and child labor laws the number of children dropping out of the upper grammar grades has been steadily decreasing in the last 10 years, as is shown by the following table:

TABLE 4.—SCHOOL ENROLLMENT IN PUBLIC SCHOOLS, BY YEARS.

[In the ungraded rooms for special students, most of whom were over age and backward, 440 were enrolled in 1914-15. These are not included in the distribution in the table.]

Grade.	1905-6	1906-7	1907-8	1908-9	1909-10	1910-11	1911-12	1912-13	1913-14	1914-15	Average.
Kindergarten.....	617	705	765	694	568	982	1,062	1,847	1,939	2,568	1,170.7
First grade ¹	9,237	8,950	8,919	8,402	7,496	7,496	7,444	7,576	7,731	8,171	8,142.4
Second grade.....	5,194	5,033	4,723	5,073	5,375	4,936	4,887	4,966	5,191	5,416	5,081.7
Third grade.....	4,956	5,314	4,950	4,576	4,820	5,222	4,828	4,884	5,004	4,870	4,945.9
Fourth grade.....	5,077	4,988	5,083	5,056	4,833	4,887	5,086	4,805	4,674	4,983	4,947.2
Fifth grade.....	4,512	4,680	4,819	4,889	4,920	4,608	4,903	5,030	4,780	4,602	4,770.0
Sixth grade.....	4,072	4,346	4,408	4,459	4,373	4,740	4,590	4,579	4,815	4,574	4,494.2
Seventh grade.....	3,245	3,611	3,840	3,895	3,902	4,102	4,257	4,260	4,357	4,526	4,001.6
Eighth grade.....	2,544	2,586	3,070	3,332	3,407	3,454	3,730	3,630	3,699	3,890	3,334.2
Ninth grade.....	1,474	1,642	1,892	2,326	2,222	2,312	2,515	2,640	2,805	3,010	2,363.9
Tenth grade.....	1,244	1,409	1,359	1,359	1,479	1,490	1,554	1,715	1,777	1,919	1,539.6
Eleventh grade.....	729	815	858	876	956	1,067	1,096	1,152	1,264	1,339	1,026.2
Twelfth grade.....	701	604	654	650	794	848	1,127	926	996	1,111	842.2

¹ Figures for first grade throughout includes beginners admitted in January.

The number of graduates from the high schools for the several years was as follows: 1908-9, 741; 1909-10, 762; 1910-11, 819; 1911-12, 849; 1912-13, 907; 1913-14, 971; 1914-15, 1,088.

The discrepancy between the number enrolled in the twelfth grade in 1908-9, 650, and the number graduating from high schools in that year, 741, is not accounted for by the statistical department.

The table shows that the enrollment in the first six grades has remained fairly constant, and that the various school attendance laws have retained in the seventh and eighth grades many pupils over 14 who without this legislation would have left school to go to work. The best evidence of this is furnished by comparing the general

average for the seventh and eighth grades for all the years with their enrollment in 1914-15. The enrollment in the first six grades remained practically the same since 1905, while in the seventh grade it rose from 3,245 to 4,526 in 1914, an increase of 39 per cent, and in the eighth grade from 2,544 to 3,800, an increase of 53 per cent.

Notwithstanding this gratifying improvement in the number who remain longer in school, there is still much elimination in the eighth grade and in the high school. The average enrollment as given in the foregoing table shows decreases in enrollment beginning with the ninth grade, as follows: From eighth to ninth, 32 out of every 100; from ninth to tenth, 32; from tenth to eleventh, 33; from eleventh to twelfth, 18; and from eighth to twelfth, 75 out of every 100 enrolled in the eighth grade.

Considering only the 1914-15 grades, the falling off per 100 in each grade as compared with the preceding grade is 14 in the eighth, 23 in the ninth, 36 in the tenth, 30 in the eleventh, and 17 in the twelfth; while the twelfth as compared with the eighth showed a falling off of 71 out of every 100. Comparing the 1,111 enrolled in the fourth year of high school in 1914-15 with the number in this same class in the eighth grade (1910-11), one finds a loss of 68 out of every 100 enrolled in the eighth grade.

While the proportion of pupils who enter the second grade and reach the eighth grade and enter high school is increasing rapidly, that of eighth-grade pupils who complete high school has remained practically constant during the last seven years. Using as a basis the enrollment of each graduating class in the eighth grade, one finds that beginning with the graduating class of 1909-10, consecutive graduating classes had remaining out of every 100 enrolled in the eighth year the following, respectively, 31, 33, 37, 28, 29, 32; and, therefore, lost out of every 100 for these years, 69, 67, 63, 72, 71, 68.

It is fair to say that the present child labor laws of Minnesota do not permit children under 16 to work in factories and shops. Furthermore, the attitude of some employers is against engaging boys and girls under 16. The result is that some high school pupils, especially in the first and second year, drop out on reaching the age of 16 to find the employment they could not get before.

It would seem, however, from the figures given, that the present high school courses are holding a somewhat fixed proportion of the youth who finish the eighth grade, and to increase this proportion new courses must be provided which appeal to the interest and meet the vocational needs of the pupils who now leave before completing the high school. A treatment of the facilities thus far provided for giving these courses will be found later in this chapter.

ELIMINATION.

The survey has made no extensive study of elimination in the Minneapolis schools other than to ascertain such facts as have direct relation to vocational education. Neither has it attempted to make extensive comparisons with conditions in other cities. It has been impossible within the limits of this report to give any comparative treatment of the complicated statistics available, based, as they are, on varying standards and methods. All comparisons show, however, that in holding its children in school from the first to the twelfth grade inclusive, Minneapolis ranks among the highest of all the cities of the country.

The object in discussing elimination here is not to make comparisons favorable or otherwise between Minneapolis and other cities, but to point out that Minneapolis has the same problem as they, even if in lessened degree—the problem of the children who go to work without completing the school course and with no adequate vocational preparation.

The causes of withdrawal were reported by the teachers of Minneapolis for all pupils leaving school in 1914–15. Of 2,572 pupils over 14 years who left the schools in that year 1,372 were enrolled in the grades and 1,200 in the high school. These figures do not include withdrawals in summer vacation. The following shows the reasons assigned by the teachers for these withdrawals:

TABLE 5.—CAUSES OF WITHDRAWAL OF PUPILS FROM PUBLIC SCHOOLS.

Cause of withdrawal.	Elementary.	High.	Total.
Left the city.....	316	173	489
To attend private school.....	146	79	225
Death.....	10	5	15
Economic pressure.....	40	28	68
Illness of pupil.....	75	240	315
Illness in family.....	25	56	81
Physical defects.....	12	5	17
Incapacity (mental).....	26	25	51
Indifference.....	34	131	165
Falling promotion.....	9	37	46
Went to work.....	629	331	960
Unexplained.....	50	90	140
	1,372	1,200	2,572

Assuming that practically all who left the schools for the last eight reasons above went to work, 1,843 pupils, or 72 per cent of the total number leaving, should be included in the "go-to-work" group.

Between the total enrollment of grades 5 to 11 inclusive, in 1913–14, and grades 6 to 12 inclusive, in 1914–15, there is a difference of 3,148 pupils. This represents those who dropped out in the school year 1913–14 and the summer of 1914 but does not include those who left the twelfth grade before graduation. This calculation disregards the number entering and leaving the public schools in 1914–

15. Consequently, the estimate of 3,148 pupils in grades 5 to 12 inclusive, appearing to have withdrawn between September 1, 1913, and September 1, 1914, is rough rather than accurate.

Assuming that the causes of withdrawal were in the same ratio as those given in the foregoing table for 1914-15, 72 per cent of the pupils withdrawing from September 1, 1913, to September 1, 1914, would constitute the go-to-work group, 2,266 in number. This, for reasons already given, is a low estimate of the number over 14 years old who leave the schools to go to work each calendar year, but is twice as large as the number enrolled in the senior class of the high schools for 1914-15, and is larger than the average enrollment of junior and senior classes for the last seven years.

These withdrawing pupils should have had preparation for wage earning before leaving school. Some idea of the problem may be gained from the fact that if for two years before their withdrawal special consideration were given to the vocational interests of this group who annually go to work, it would involve during any year the question of providing facilities for nearly 4,532 children, disregarding the fact that many of the 225 children who withdraw every year to attend private schools also would remain for vocational instruction. The failure to provide vocational education for this go-to-work group has been an even greater loss to general education, because they have been deprived of the experience and training which would be most educative to them from any standpoint.

No direct comparison is possible between the estimate of the go-to-work group and the number granted employment certificates, as the former includes all over 14 years old and the latter only those from 14 to 16. Furthermore, the withdrawal figures are based on reports from schools in June, 1915, and the employment certificate figures on daily records of the attendance department. The age in one case is that on September 1, 1914, and in the other on the day of issuing the certificate. Under the new system of reporting withdrawals to the attendance department as they occur, it will be possible to get exact figures.

RETARDATION.

The evil results of retardation are too many to be enumerated. While some over-age children are behind grade because of late entrance to the schools, an overwhelming majority have repeated one or more grades. In his book, "Laggards In Our Schools," Dr. Ayres gives the number of repeaters in the Minneapolis schools for 1907 as 8,465. At that time Minneapolis stood forty-second among the 55 cities on the list in this showing.

Retardation is one of the chief causes of elimination. Pupils who are behind grade feel humiliated by being grouped with younger

pupils and discouraged by repeated failure in academic studies, and leave school to become wage earners where they may associate with persons their own age, find expression for their interests and aptitudes, and meet with some success as measured by a pay check.

It is the purpose of this report not to give remedies for elimination and retardation but rather to show their relation to vocational education. Training in the subjects which underlie all education is fundamental to vocational education. It is doubtful whether pupils who have not reached the seventh grade can profit much by specific training for a vocation, and the training for many vocations requires a complete elementary education. Certainly any degree of advancement lies open only to the person with such fundamental preparation. The effect of retardation is that thousands of children reach the age when they require vocational training with insufficient general education to profit by it. The certainty that the usual child will leave school at the earliest opportunity places the grave responsibility upon the school not only of giving him vocational training before he leaves, but also of preparing him to receive it.

Accurate figures showing age and grade of all elementary and high school pupils were gathered at the close of 1914-15, and constitute one of the most reliable reports on the subject yet made. Of 51,449 in both elementary and high schools, 13,336, or 25.9 per cent—not including 440 pupils in special classes, most of whom were retarded—were over age for their grades from one to eight years.

While this number is large, Minneapolis in this respect compares favorably with the rest of the country. In a report of Dr. Ayres on "The Identification of the Misfit Child" figures for 29 cities show that on the average 37 of every 100 children were over age. Minneapolis is not given in this list, but if given would have stood third from the top. Only Quincy, Mass., and Springfield, Ill., made better showings, the former having 19 and the latter 24 per cent over age. These figures can not be regarded as measuring a change in Minneapolis, since the former study related to repeaters and the latter to over-age pupils.

The number of over-age pupils will doubtless show an increase in 1915-16 because of the more rigid enforcement of the law and the retention in school of pupils over 14 and under 16, to whom employment certificates have been granted formerly. In 1913-14 there were 103 such pupils. In 1914-15 65 nongraduates of the elementary school obtained working certificates previous to March 8, when the practice was discontinued. Of 4,918 14 and 15 year old children in the elementary schools in 1914-15, 3,610, or almost 3 out of 4, are one year or more behind grade. Of these over-age children, 2,522 are boys and 2,396 girls.

These boys and girls over 14 and under 16 years old who are behind grade are distributed among all the grades from first to eighth inclusive, and a few are in special classes. The law requires them to attend school; practically none will go to high school; most will go to work as soon as the law permits; and, since the State exacts school attendance on the theory that they need larger preparation for life, the grave responsibility rests upon the school to teach them not only the three R's, but how to earn a livelihood.

Practical activities in industrial arts properly taught in the elementary school will tend to prevent retardation by appeal to the "motor-minded" child, through action rather than abstraction, while to this type the industrial school supplies training in general education more successfully than the regular school. Except for a few special ungraded classes for misfit and foreign boys and men, having a total enrollment of 378, of whom only 60 were under 16 and 206 were 21 or over, no special provision has been made for over-age boys. Except for classes for misfit girls having a total enrollment of 62, of whom 41 were under 16, and the Girls' Vocational High School recently established, to which girls who have reached the seventh grade are admitted, no provision has been made for over-age girls.

No common standards or system of promotion is used in advancing pupils from one grade to another in the elementary schools or from one subject to another in the high schools. Each teacher determines what shall be done in each case. No common understanding for judging the work of pupils and their fitness for promotion exists as between the same grades in one or in different buildings. While some freedom and flexibility in the teacher's work should be preserved, practically all the school people with whom the survey came in contact believe the time ripe for a thorough study of the question of promotion in order to deal with it in a more systematic way, which, while applying common standards and requirements, will leave large opportunity for the exercise of the teacher's judgment.

Vocational education is not primarily for the retarded child. It is most effective with the normal, capable adolescent and adult. The Minneapolis schools now offer instruction in manual training and domestic science and art from the sixth grade through high school, and four-year commercial courses in each high school. The Girls' Vocational High School, established in December, 1914, offers two-year courses in dressmaking, millinery, cooking, salesmanship, and stenography. Evening classes cover a variety of subjects in industrial, commercial, and household arts courses. This work is treated elsewhere.

SUMMARY OF STUDY MADE BY THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

(1) There is need of a careful consideration of the present unsatisfactory and contradictory condition of some of the Minnesota laws relating to children so that a codification of these laws may be made at the next session of the legislature.

(2) A provision defining school absence should be enacted into law so that there may be hereafter uniform and accurate measurement of attendance conditions in all the school districts of the State.

(3) The committee recognizes that much idleness, deplorable from a social as well as an economic standpoint, exists in Minneapolis, as it exists elsewhere, among the youths who, as soon as they have passed beyond the age of compulsory attendance, leave school to become either casual workers or idlers; and it recognizes that the time will come when such young people will be required, as a necessary measure of social and economic well-being, to go either to work or to school. What is needed now, however, is rather to perfect present legal and school facilities for conserving all the children of the city and State up to the level of 16 years of age.

(4) All children between 12 and 16 years old who are engaged in peddling, bootblacking, and selling papers should be required by law to procure a license to do so. Inasmuch as these children are still under the control of the public schools, this license should be issued by the school authorities.

(5) Provision in the compulsory attendance law is needed that will give the school authorities the power to exercise discretion in issuing employment certificates, permitting some children in exceptional cases to go to work before completing the eighth grade as the law now requires. While the committee favors the general provision of the present law requiring all children who have not been graduated from the eighth grade to remain in school until 16 years old, it believes that, where common sense demands, there should be an opportunity to place the child in school or in industry as circumstances require and the welfare of the child dictates.

(6) There is great need of legislation permitting the compulsory commitment of feeble-minded children to an institution so that defectives who are not delinquent may be committed when it is deemed advisable by the courts without the strained interpretation of the powers of discretion lodged at present in the judge of the juvenile court.

(7) In order to enforce the present compulsory attendance law in some cases, there is need of a more complete statement in the law of the evidence required from parents to establish the birth dates of children.

(8) While the Minneapolis high schools rank among the very best in the number of youths whom they attract and hold, the statistics show that the proportion of the boys and girls who have finished the eighth grade and entered the high schools has remained almost constant for the last five years. If this proportion is to be increased, new courses must be provided which appeal to the interest and meet the vocational needs of the kind of pupils who either never attend the high school or leave before completing the four years.

(9) Since the State has exacted school attendance of the retarded and backward children over 14 and under 16 years old on the theory that they need longer preparation for the duties of life, the grave responsibility rests upon the school of giving them the preparation not only in the three R's, but in the things which will enable them to earn a livelihood.

(10) While the record of the Minneapolis school as regards both elimination and retardation is among the best in the country, there is need here as well as elsewhere for a larger number of special classes or schools to handle misfit and over-age boys and girls, which will make practical training in the activities of the shop or home a large feature of their efforts not only to interest and to teach, but also to prepare for useful work the "motor-minded" child.

MANUAL TRAINING IN MINNEAPOLIS PUBLIC SCHOOLS.

This section as presented is approved by a special committee on manual training of prominent western men connected with such work.

The work of the manual training classes in the Minneapolis schools is in many respects of a high order. Few cities provide as good an equipment or teachers of as much preparation and experience. Measured by the usual standards for manual training of the same kind, the work would rank among the highest. With constant appreciation of the excellence of this work this report has attempted to evaluate it in terms of vocational preparation. Without question, the work in the manual training shops is a valuable and, for many boys, an essential part of general education. The question under consideration in this chapter is to what extent the manual training work is meeting the need for prevocational education and for vocational education.

The manual training department of the Minneapolis schools includes all the boys of the sixth, seventh, and eighth grades, and offers a four years' course in each of the high schools. The subjects taught in the course, with their time allotments, are as follows:

Sixth grade, woodwork, 1 hour a week.

Seventh grade, woodwork, 2 hours a week; drawing, 1 hour a week.

Eighth grade, woodwork, 2 hours a week; drawing, 1 hour a week.

First year high school, two periods a day, woodwork and drawing.

Second year high school, two periods a day, turning, pattern making, and drawing.

Third year high school, two periods a day, forging and drawing.

Fourth year high school, two periods a day, machine-shop work and drawing.

Thus woodwork is given in five successive years from the sixth grade through the second year of high school.

All the teaching of manual training is done by special teachers, under the supervisor. Fifty-eight special teachers are employed, 26 in the high schools and 32 in the elementary schools. The cost of the instruction in 1914-15 was \$82,500.

It is the policy of the school authorities to furnish all necessary tools and equipment and all material for the required work. For special work or projects for his own use, the boy furnishes the material. The total amount expended for material in the year was \$17,500. Thirty-two elementary schools and each of the five high schools are equipped with manual training shops, and 16 elementary schools and all the high schools have drawing rooms. The cost of equipment, exclusive of rooms, lighting, and heating, is approximately: Elementary schools, \$17,600; high schools, \$118,700; total, \$136,300.

MANUAL TRAINING IN ELEMENTARY SCHOOLS.

Thirty-two schools have shops fitted with benches and tools for a course of handwork in wood. A few buildings are equipped to carry on the work in the regular schoolroom with a few tools on the pupil's desk. Sixteen schools have separate rooms with tables and other equipment for mechanical drawing. The cost of standard equipment for one building is \$550, making the total cost in elementary schools \$17,600, exclusive of rooms and lighting and heating facilities.

All the 32 manual training teachers in the elementary schools are high school graduates; 12 attended college two years or more; 17 attended normal or teacher training schools two years or more; 1 has had one year, 3 two years, and 5 three years or more of practical shop experience. These teachers were paid \$39,400 in salaries, an average of \$1,231.25.

Considerable repair and construction work for the schools is done by the elementary manual training classes. They have made library tables, bookcases, and filing cabinets for the offices, davenport, costumers, and screens for the rest rooms, cabinets for the phonograph records, and large seats for the halls.

The general aim of this elementary manual training work as stated in the course of study is "to promote honesty, industry, and health, to cultivate self-reliance, to develop general efficiency and skill, and

to help the boy to discover the place for which he is best adapted in the vocational world."

If the last aim is to be realized, the present course which affords a very brief experience in handwork in wood only must be enlarged to include representative industries and occupations, such as metal, printing, electricity, clay, and building materials. The school authorities have fully recognized the need for enlarging the elementary work, but it has been delayed from time to time, largely because of the continued discussion during the last seven years of a proposed intermediate school wherein such courses in prevocational education were to be given.

No adequate training in manual work for the boys who can not go to high school has been provided. The high schools, in a pamphlet to prospective students, state that "it is the intention of the city to give all its young people an equal chance in getting an education which will start them in some useful calling." While Minneapolis has been making rapid and commendable progress in this direction, much remains to be done.

A little less than half of the boys of the city never enter the high schools. Last year, of boys over one year behind grade there were in the sixth grade 415 from 14 to 17 years old, inclusive; in the seventh, 427 from 15 to 17; and in the eighth, 257 from 16 to 17. There are more boys over 14 who are over one year behind grade than there are boys in either the third or fourth years of all the high schools. These boys behind grade from one to four years will go to work without finishing the eighth grade, and practically none ever will attend the high school.

All the manual training thus far open to this group is one hour a week for woodworking and drawing in the sixth grade and three hours in the seventh and eighth grades. This elementary experience in woodworking alone neither furnishes a basis for choosing an occupation nor gives any marketable skill in woodworking. Since these pupils will not be admitted even to the manual training courses of the high schools without fulfilling all the requirements of the elementary school, they are denied "an equal chance of getting an education which will start them in some useful calling."

This group ought to be taken care of if the schools are to supply "an equal opportunity for all." A number of these boys who have completed at least the seventh grade may get training for the trades hereafter at the Dunwoody Institute, whose work is designed to supplement that of the public schools for the industrial and mechanical arts. A large part of this group will not be qualified to attend the institute and adequate provision for them should be made in the public schools.

To this end, manual training in the elementary school should aim to provide a wide variety of experiences in different industries so as to give the boy a basis on which to choose an occupation. Pre-vocational training should present a course of study that will appeal to boys who have lost interest in regular school work, and who legally can not leave school to go to work.

The course of study must be a varied one if it is to help boys to discover their aptitudes and choose their life work. What is needed is not a course in woodworking or in metal work, but organized training in practical arts which will include a variety of experiences fundamental to the life of the community. Woodwork, metal work, printing and bookbinding, clay modeling, concrete and electrical work, are among industries which give experience in certain fundamental processes most valuable to boys without respect to their occupation later. A plan for such work should consist of a series of jobs, projects or enterprises which will give the boy an understanding of the more important industries.

Instead of three hours a week, shopwork should be given at least $1\frac{1}{2}$ hours a day and the school day lengthened if necessary.

For the interests and capacities of the boys, shop experience must be as real and the work as nearly a sample of the process of the industry as conditions permit. Not only must instructors possess a general acquaintance and knowledge of the industries represented, but they should have ability to make intelligent study of the methods and processes of the industries.

If at any time the public schools of Minneapolis should provide for intermediate, or junior, high schools covering the last two years of the elementary and the first year of the present high school period, the prevocational work herein proposed could best be given in such schools. A suggestive course of study in such an event will be found in Appendix E.

The abandonment in 1914 of the Thomas Arnold School for delinquents, retarded and dissatisfied boys has thrown back upon the elementary schools a group of boys who demand special treatment, including training for some useful work. The large number over 15 who have not reached the seventh grade shows the need of special classes, or of establishing some school to do the work formerly done by the Thomas Arnold.

Last year there were in the sixth grade 351 girls from 14 to 17 years old, inclusive, in the seventh 341 girls from 15 to 17, and in the eighth 210 girls from 16 to 17, a total of 902. These constituted a group nearly as large as the total number of girls in the third and fourth years of all the high schools. The report of the vocational survey of Minneapolis made in 1913 recommended not

only that the Thomas Arnold School be enlarged to include all boys who had reached the age of 15 and had not yet reached the seventh grade, but that a similar school be organized for girls.

Special classes have been established for over-age and discontented boys in various elementary schools. These were intended to take the place of the Thomas Arnold School and are, in the absence of a special school for the purpose, a necessity. They have not so far been prevocational, as the shopwork is confined to woodwork and is the same as the manual training work of the elementary school, with the addition of two or three hours a week. The classroom work not only is of the same kind as other classroom work in the same building but is taught in the same way. The only difference between these and the regular classes is that these are ungraded and for boys only.

There is no correlation of work which makes the interest and experience of the boy in the shop a means of teaching him in his other studies. These boys need the kind of prevocational education previously described. While their distribution among different schools has the advantage of making them a part of the regular school population rather than a group segregated because of their deficiencies, there is danger that their special interests may be forgotten and that proper teachers, courses, and facilities will not be provided.

The establishment of intermediate schools for the seventh, eighth, and ninth grades, with their more intensive prevocational training, would provide centers in which pupils of the special classes would be associated with pupils of their own age and should receive more careful and thorough preparation for wage earning.

MANUAL TRAINING IN HIGH SCHOOLS.

Manual training is one of the seven courses offered in the high schools, which include general, commercial, manual training, home economics, arts, Latin, and modern language courses. The work is given in five high schools, each with woodworking, turning and pattern making, forge, and machine shops, while one high school also has a molding shop.

Two years of manual training and drawing are offered in the general, and four years in the manual training course. The manual training work and drawing of the general course is the same as that of the first two years of the manual training course. The pupils following the manual training course receive two periods of 45 minutes each every day of instruction in either shopwork or drawing during the entire four years.

The shop and drawing work of the manual training course is as follows:

First year—

First semester: Mechanical drawing and wood joinery.

Second semester: Mechanical drawing and cabinet work.

Second year—

First semester: Mechanical drawing.

Second semester: Turning and pattern making.

Third year—

First semester: Machine or architectural drawing.

Second semester: Forge work.

Fourth year—

First semester: Machine shop or carpentry.

Second semester: Advanced machine or architectural drawing.

During the first year the shopwork and drawing are given on alternate days, during the other years in alternate semesters.

The following equipment of one high school department indicates the extent of the shop equipment of Minneapolis high schools:

Woodwork shop: 24 cabinet benches, 1 planer, 1 joiner, 1 band saw, 1 mortiser, assembling room with dry kiln, recitation room for lecture purposes and finishing room for staining and varnishing.

Wood turning and pattern shop: 20 cabinet benches, 20 motor-head lathes, 1 large wood lathe for large work, trimmer, band saw, jointer and all necessary hand tools.

Forge shop: 10 double forges and other equipment for 20 pupils, 1 demonstration forge, tempering furnace, power hammer, drill press, power cutter, and small grinder. This shop has raised seats for lecture purposes.

Machine shop: 8 engine lathes, 1 miller, 1 planer, 1 shaper, 2 drill presses, 1 wet grinder, 2 speed lathes, with tool room and small tools.

The equipment for all the high schools represents an expenditure approximately as follows:

Woodwork, turning, and pattern making.....	\$45,475
Forge shops.....	16,264
Machine shops.....	50,593
Molding equipment.....	2,190
Drawing.....	4,150
Total.....	118,672

These shops are idle much of the time.¹ Four high schools use the wood shops and pattern-making shops for day class instruction, six periods, or 4½ hours a day, a total of 855 hours a year, or 107 eight-

¹ In the last school year nine possible school days were observed as holidays. Considering these nine days and other time lost in opening and closing school it is evident that the school shops were not in use more than 38 weeks. The foregoing calculations, therefore, are based upon a school year of 190 days.

hour working-days. One uses its wood shop 3 hours a day, or 570 hours a year, or 71 eight-hour working days; one its forge shop 3 hours a day, or 570 hours a year; three the forge shop $1\frac{1}{2}$ hours a day, or 285 hours a year; one its machine shop $4\frac{1}{2}$ hours a day, or 855 hours a year; two the machine shop 3 hours a day, or 570 hours a year; two the machine shop $1\frac{1}{2}$ hours a day, or 285 hours a year; in one the molding room is used only a small fraction of the time as supplementary to the work of the pattern shop, and when the molding shop is in use the pattern shop is idle. These shops, however, are in partial use by some students from one to two hours each afternoon after school.

Each manual training student receives only 19 weeks of shopwork a year. Allowing $1\frac{1}{2}$ hours a day, not considering the time in passing between classes and in washing and cleaning up, the student has $142\frac{1}{2}$ hours or 18 eight-hour working-days of joinery and cabinetmaking, 18 working days of wood turning and pattern making, the same time in forging and in machine-shop work. He also receives 570 hours or 71 eight-hour working-days of mechanical drawing during the entire course.

The number of boys in the manual training classes in the five joinery shops was 321 in the past year; in the five pattern-making shops, 247; in the five forge shops, 97; in the five machine shops, 93; or an average in each joinery shop of 64; in each pattern-making shop, 49; in each forge shop, 19; in each machine shop, 19.

About two out of every three manual training teachers have had practical shop experience. Four women teach mechanical drawing, each a university graduate with practical drafting-room experience. Of the 22 men teaching in the high schools, all have had high school education, two summer schooling and experience in commercial shops, three training in normal or teacher training schools, two years or more, with no practical experience; 14 are from normal or teacher training schools; six have had both normal school and college training, five college and no normal school training, eight normal school but no college training; one has had one year, three two years, six three years or more, and three five years or more of practical shop experience. Several have been teaching manual training in the Minneapolis schools 15 or 16 years.

The teacher of manual training is not required to have had any commercial shop experience, but the rules and regulations recently adopted by the board of education require him to be a graduate of a four-year high school. He will be eligible if, in addition, he has had a four-year collegiate course of the grade furnished by the University of Minnesota and has made "a special and adequate study of the subject to be taught," either some shop subject or drawing.

No provision has been made requiring teachers with merely school experience in manual training to obtain actual shop experience after they enter the service. The practical mechanic is eligible to appointment if he has had two years of training beyond a four-year high school course and also four years of experience in a trade.

Most of the shopwork consists of exercises and projects involving fundamental principles, processes, and operations. The exercises usually result in articles taken home by the student, or less frequently utilized by the school. Sewing tables, kindergarten benches, tables, and picture frames have been made for the schools in quantities. Forging classes have made metal work for clothes hangers, hat racks, and racks of other kinds. Machine-shop classes have made vises for school benches, and one school made 225 governor gears for an automobile concern. The value of the work done for the schools, including a small amount by the classes of the elementary schools, was estimated to be \$2,611.45 for the last school year.

As a rule the teaching is very well done, considering the small amount of time allowed in a scheme of recitation filled with college preparatory courses in a short school day. The pupil gets a general knowledge of industrial processes, but does not get adequate practice or experience, in the judgment of the Minneapolis trades and industries, to prepare him for advantageous entrance into the skilled industries. In fact, most boys who are taking the work do not expect to go into the trades as apprentices or journeymen, and the instruction is not given with this in view.

The work of the shops and drawing rooms is closely correlated. Most of the things made are first planned in the drawing rooms. In the first year the student makes the drawings of the furniture which he builds in the shop. He continues to do this for all articles which he takes home. The things made for the school are constructed from plans furnished by the drawing room, which he helps to devise. There is, however, no correlation between the shop and drawing-room work and the other subjects of the courses.

The total cost of the manual training in the high schools for 1914-15, exclusive of charges for light, heat, janitor service, interest on capital invested, and depreciation of equipment, was \$46,315. Of this, \$40,200 was for salaries of instructors, \$1,300 for half the salary of the supervisor of manual training, who gave about half of his time to the high schools, and \$4,815 for materials used.¹

As compared with other studies, the per capita cost for manual training is high. For the two semesters the average number in

¹ The cost of all materials used in the high school was \$6,158.45. The departments did such work as manufacturing furniture and making repairs for the school, whose value was \$1,343.66. This amount deducted from the total cost of materials used leaves \$4,814.79 as the amount of the net cost.

the shop classes was 758 and in the drawing classes 793. Each pupil had one semester of shopwork and one of mechanical drawing. The per capita cost for instruction in both for one year was \$25.91. For instruction, supervision, and materials it was \$29.86, of which over half was for shopwork alone. Fifteen teachers taught shopwork and 11 mechanical drawing. Each manual training and drawing class requires two periods, each instructor teaching three classes a day, or a total of 570 recitations in 38 weeks. As the average salary of the teachers is \$1,546 a year, the cost of instruction for one recitation in shopwork or drawing is \$2.71. The cost of instruction for one pupil for one two-period recitation in shopwork was \$0.161 and in mechanical drawing, \$0.111. This is about the same as in other large cities.

It is difficult to evaluate the manual training work of the high schools. In so far as it meets the needs of general education for those who desire elementary experience in tools and processes, the work compares favorably with that of other cities. This report is concerned with the question as to what extent this manual training is a factor in a program of vocational education for Minneapolis.

The four years of mechanical drawing furnish excellent preparation for entering drafting rooms of industries and for other occupations requiring such training. The number of high school graduates who after four years of drawing for one period a day go into it as a business is, however, very small. Last year nine entered offices as architectural or mechanical draftsmen.

In evaluating the shop courses as a factor in vocational training for the industries of the city five questions at least, which are treated in the following paragraphs, must be considered:

Do the high schools attempt to train boys for the industries? The prospectus of the high schools issued to students states that "it is the intention of this city to give all its young people an equal chance in getting an education which will start them in some useful calling," and that "each course of study leads to something beyond, either a calling in life or further study in a higher school, college, or professional school." The manual training course "gives boys who desire to become skilled workmen an opportunity to find the life work for which they are fitted by the presentation of the elements of several industries. While no trade is taught, the boys are led to acquire industrial intelligence and general mechanical skill. With this as a foundation one may at once enter upon wage earning with prospect of speedy advancement in his chosen trade. If subjects have been wisely chosen, those taking this course are eligible for entrance to college."

The principals of the high schools declared this to mean that the purpose was to give a regular high school education which might lead to college, and at the same time experience in industrial pro-

cesses which would help in making an intelligent choice of an occupation. The controlling aim of the manual training work was declared to be general and cultural and not vocational education.

Do boys take the manual training to get preparation for the industries? In all 1,276 high school pupils answered the question, "Why are you taking this course?" Out of every 100, 23 said, "For general training"; 29, "Intend to use it in my vocation," without naming any specific vocation; 25, "Preparation for the university"; 10, "Because I like it"; 6, "Because it comes in the course"; 3, "Because it steadies the hand and makes one accurate"; and 3, "Because it is useful about the house."

While 369 students declared they were taking the instruction as preparation for a vocation, only 186 were registered for the fourth year work for 1914-15, and only 149 were reported as graduating from the manual training course for one year, showing that most students who elect manual training for vocational purposes either leave high school before completing the course or abandon it for other courses before being graduated, the former being much the more frequent case.

This abandonment of the manual training course is due, partly at least, to the fact that a number take the fourth year of the general course in order to meet the entrance requirements of the university without being required to take one extra study as they would have to do if graduated from the manual training courses.

Do boys completing the work enter the industries? Out of 149 graduates from the manual training course in the last school year 72 declared their intention of going to college and 77 to work. Of the 77 going to work, only 14 intended to enter occupations for which the course was in any way preparatory. Of these 14, 9 went into drafting-rooms, 3 became machinists, 1 an engineer and 1 a farmer. Except that there came from manual training courses about two-thirds of the 49 graduates of all courses who announced their intention to attend the engineering school of the university, the students of this course go into about the same kind of occupations and take about the same kind of college work as graduates of the general course of the high schools. Except for its influence on the 14 graduates noted, the course is no more directly vocational than the general course.

Does the manual training give adequate preparation for the industries? With the exception of the drafting room where he receives in the four years 71 eight-hour working-days of mechanical drawing, the student gets during the high school career the equivalent of only 18 working-days in each shop subject, or 3 weeks of instruction in each of the 4 lines.

The boy does get from the manual-training work experience of unquestionable value. Beyond this, he acquires some amateurish skill in a few lines of industry. If he desires to go to college, the manual training furnishes another avenue of expression for which he may secure credit on the entrance requirements. If he goes to work, he has an elementary knowledge of tools, machines, and processes fundamental to many industries. Doubtless many boys who have not completed the course have gone into industry with a valuable asset of this fundamental knowledge.

The boy does get from the manual training work experience of un-course gives boys who desire to become skilled workmen an opportunity to find the life work for which they are fitted by presenting the elements of several industries. The course can not serve this purpose well until it covers more than four trades dealing with two materials. Pupils take woodworking in some form for five consecutive years, three in the grades and two in the high school, before any change of material is offered. The lack of flexibility in the course makes it impossible to try machine-shop experience until they reach the fourth year, which means that about two of every three drop out of school without sampling this line of work. Furthermore, the two years of manual training in the general course gives instruction in wood only. Statistics previously given show that only a few boys who complete high school enter the trades.

As a venture in prevocational training, the manual training offers these boys a chance to sample trades in which very few are interested as prospective occupations. The group destined to become wage earners never enters high school at all. Thus far only the high school has provided any opportunity for sampling the trades. Entrance requirements to high school manual training work, however, preclude the use of the shops by boys over 14 years old, who might profit by the work there offered, but can not because they have not completed the elementary school. Attention is here called to the time these shops are idle, previously considered.

The manual training work as preparation for the engineering college of the University of Minnesota and other engineering schools calls for consideration. No doubt some boys are attracted to the high school, held there, and pointed toward the engineering college for professional work by the manual training of the high school, which has thus rendered valuable service. It is a mistake, however, to consider this work as an essential preparation for the engineering college under present conditions. Pupils can get admission to the engineering college just as readily from the other courses of the high school and without instruction in manual training. In fact, 6 of the 17 graduates of the high school finishing last January and electing the engineering college came from the general courses.

One year of manual training in high school is necessary for the prospective student of dentistry in the University of Minnesota. On the other hand, the dean of the College of Engineering at the university does not regard high school manual training as advantageous or desirable for the student who is to take an engineering course, but prefers that he devote his time in high school to academic studies.

This attitude is not supported by the superintendent of schools, the supervisor of manual training, the assistant superintendents, or the principals of the high schools of Minneapolis, all of whom believe strongly that manual training work is a valuable preparation for the engineering course.

They say that manual training attracts many boys who in its absence would not go through high school and consequently would not prepare for the engineering college or attend it. More than two out of three from all the courses entering the engineering college each year come from the manual training course, and its effect has been to increase both the high school enrollment and that of the engineering college, for which it is the chief source of supply so far as Minneapolis is concerned. "The boys who elect the manual training course of the high schools are usually boys who have a natural interest and ability for mechanics and drawing. They should, and in most cases do, furnish fine material for the engineering school." "There is danger that our engineering schools will lay too much emphasis on theory and too little on practical considerations in the selection and training of men. Most of the big work of the world in engineering is being done by practical men of large experience and executive capacity."

The limits of this report will not permit further discussion of the very interesting and somewhat vital issue thus raised.

The engineering college would be willing to give credit for freshman shopwork in the university "if the high school work were of acceptable grade." At present, for entrance to all courses at the university, students receive credit for only three units of manual training work, whereas academic studies in the high school pursued for equal time receive four units. It would seem, therefore, that to make the manual training work count on the engineering course, if it should be given for that purpose, arrangements should be made in the high schools to provide in the upper years of the manual training course exactly the amount and kind of shopwork for which the university would give advanced standing to students preparing for the engineering college, but for this group only, at the same time requiring of this group the full 15 units of academic work necessary for admission.

If a city is to provide equal opportunities for all boys to receive training for their life work, it must continue and enrich the college preparatory courses which the American high school has developed to such a high degree of excellence. These courses are for leaders,

the commissioned officers of every vocation and avocation of life. It must also make provision for the noncommissioned officers and private soldiers of these vocations, so that they may have their "way out" to happiness and larger fields of usefulness.

In Chapter XVIII, on "Noncommissioned officers of industry," a full discussion will be found of the need in Minneapolis for young men who have had, in addition to high school education, special training for entrance to the directive and business side of industry. A course of study,¹ which was approved by the Civic and Commerce Association and the business men of the city, is now being established in the Central High School. This course furnishes the largest opportunity of the high schools to meet one of the greatest needs of business and manufacturing life. Few boys who complete a high school course go into trades as producers. The boy who wishes to enter the trades feels that he can do better without the high school course, at the close of which he would be approaching the age of 20 and facing four years of apprenticeship at low pay.

On the other hand, the high school graduate who takes some practical training finds better positions open than as a machine hand or apprentice. Many occupations of an administrative, supervisory, directive, and planning type invite him. Many high school boys now enter these occupations, who testify that manual training work has helped them. Industry is eager for these boys. By a recent arrangement, it was agreed to take them as the source of supply of new employees at an entrance wage of not less than \$50 a month, when it was proposed to make the shop and drawing rooms, laboratories and classrooms give them in a lengthened day a thoroughgoing training which would make the course more vocational. For details of this arrangement see Chapter XXIII, page 528.

This work is done in many cities by the manual training or technical high school. Minneapolis seems committed to the policy of the cosmopolitan high school, and the training of noncommissioned officers of industry must be given in a school where a wide variety of courses is offered. The work can not be done properly without the establishment of a department within the school having the freedom and flexibility necessary to develop the work.

The need for the training of the boy who is to become a tradesman is dealt with in various chapters of this report. This need can not be met by any school requiring graduation from the elementary school for entrance, since a majority of the boys who enter the trades have not completed the work of the eighth grade by the time they are 15 years old, when they must begin to prepare for wage earning. Schools and classes for the boy headed toward journeymanship in

¹ See Appendix C, p. 567.

most of the trades should be open in Minneapolis to those who have completed the work of the seventh grade.

The need of preliminary training for tradesmen can not be met, for reasons already stated, by a four-year trade school. No one connected with the trades believes there is a place in Minneapolis for such a course. All, however, have affirmed the need for a two-year course giving elementary instruction in the skilled trades to take the place of the present unsatisfactory method of training new workers, and to fit for advanced apprenticeship.

The work of the day classes of the Dunwoody Institute has been planned to meet this demand. It is probable that this institution will relieve the high schools, in large part, of this responsibility so far as the capable boy desiring trade instruction is concerned.

Should the high schools ever undertake to give any trade training, they must meet this demand through a separate department in which two-year courses are offered to those able to profit by the instruction even though they have not completed the elementary school work.

It must be remembered that the academic and technical classes of an industrial school are as much of an extension of the general education as the regular classes of the elementary or high school, and that through them the student is extending his general education while getting direct preparation for wage earning. Furthermore, the training for the trade with its discipline, its mastery of mechanical processes, its applied mathematics, drawing, science, art and technique, affords as good mental discipline, opportunities for self-expression and self-mastery, education, and culture, as do the older courses of the secondary schools.

To carry out any widening program for vocational education in the Minneapolis schools decided changes in policy are necessary. The plan of making all high school courses four years long and their aim college should be abandoned. Practical courses fitting for business or preparation for industry should be established, adapted in length, content, and method to the varying needs of specific groups. There will be need of careful search for these groups and careful experiments with small numbers in dealing with them.

It will be difficult to carry on these experiments under the present policy by which each of the five high schools offers exactly the same courses. Every consideration of economy and efficiency would seem to argue that, with the possible exception of the general courses which lead to college, this policy should be abandoned for a plan whereby the different schools may be used to best advantage in giving at different centers diversified courses meeting the vocational needs of groups too long neglected.

The enrichment of the traditional courses in the high school with the opportunities for even brief courses in the manual arts was a move in the right direction. What is needed now is careful consideration by the school authorities of what is the real place of the present work and what part of the whole group requiring training in the industrial arts is getting instruction adapted to its needs. This report has emphasized the cost of high school manual training, not to criticize, as training in the manual arts is more costly than academic or general education, but to show that it has been spent for only one group, while other groups needing it for more immediate and direct purposes and requiring more thorough training have thus far not been served.

This is an issue which should be faced immediately. If the city is spending all it can afford in this direction, the question is whether it is spending it on the group that needs it most, and whether it is spending it to the greatest advantage on that group.

RECOMMENDATIONS OF SPECIAL COMMITTEE ON MANUAL TRAINING.

A special committee, consisting of western men connected in various ways with manual training work, was appointed by the chairman of the general survey committee to give special consideration to the findings on manual training in the Minneapolis public schools as here presented and to take such action concerning them as it might deem advisable. The names of the members of this committee appear in Appendix A. This committee met in Chicago on September 11 with all members present. The first draft of the foregoing report was submitted for consideration and amendment. It then was approved by the committee in the form here presented. In approving of the report as a whole, the committee laid special emphasis upon the following points:

1. That the elementary schools should be so organized as to offer a wider variety of manual activities for all children.

2. That in the upper grades of the elementary schools prevocational courses should furnish to pupils who desire them opportunities to gain definite knowledge about any specific practice in several of the most important industrial and commercial arts in order to (1) interest and hold "motor-minded" children; (2) furnish new avenues of expression in learning and doing; (3) aid in proper training in book subjects; and (4) help young people to select the kind of training and the kind of occupation they desire to follow.

3. That the intermediate school or junior high school is the best administrative agency yet devised for meeting the need of training in the manual and industrial arts for adolescent boys and girls; and that the training in each of these arts should be varied in kind

and grade, but should be sufficiently constant for a considerable time to meet the varying interests and requirements of different groups. This training should enable individual pupils to select the kind of work for which they are best adapted.

4. That short courses meeting the vocational needs of different groups be offered in the high schools and that these courses be open to all graduates of the elementary schools who wish specific vocational training, either at the beginning of a high school career or at any time during the high school years, when the pupil seeks more direct preparation for a vocation; and that this could be accomplished in part at least by admitting pupils of the early high school years, who desire it, to shop courses of the high schools now reserved for pupils of the late high school years.

5. That the four-year technical course already approved by the Minneapolis Board of Education, the aim of which is to give boys seeking advantageous entrance to industry on its business and directive side technical preparation in addition to a good high school education, is especially to be commended.

6. That, to be successful, any vocational course must have the hearty support and cooperation of all interests in the vocations concerned and, to meet the requirements of any vocation, must have information and advice which only those in the vocation itself can give. This requires, even in the case of the public schools, supported by the public and responsible to the public, the use of the advisory committee made up of employers and employees, through which the school in each of its vocational courses gets contact with the vocation. This reason for an advisory committee is self-evident. The committee believes, however, that when a great fund like that of the Dunwoody Institute, managed by a private and self-perpetuating board, however able and well meaning, divides with the public schools the task of giving specific trade education, there is another and added reason why an advisory committee should be obtained for each trade by the board of control. This reason is that the citizens of Minneapolis, through this advisory committee, may have a means of knowing how far the schools, both the regular public schools and the one providing the special fund, are meeting the interests of the vocations and the pupils; and, further, that the most efficient relationship between these two types of schools may be established to serve all interests concerned.

HOME ECONOMICS IN THE GRADES AND HIGH SCHOOLS.

DOMESTIC SCIENCE AND DOMESTIC ART IN THE GRADES.

Domestic science courses have been given to girls in the seventh and eighth grades for two full years, and sewing in the sixth, seventh, and eighth grades for three full years. Cooking classes have had

one 2-hour period, and sewing classes one 1-hour period a week, making a total of 152 hours for two years of cooking and 114 hours for three years of sewing.¹ Optional classes in both subjects for pupils desiring extra work and for those more interested in hand-work than in books are also provided.

In the past year 5,360 pupils were registered in the day cooking classes, of whom 2,950 were in the seventh grade, 2,100 in the eighth, and 310 in special classes. Pupils in day sewing classes totaled 8,732, of whom 4,321 were in the sixth, 2,332 in the seventh, and 2,079 in the eighth grade. Individual recipes are used for grade cookery, and one meal at the close of each half year is planned, prepared, and served. Children do not work out proportions in individual recipes, but use printed recipes.

Individual recipes are favored by those in charge for the following reasons: (1) The cost is decreased (cost per capita to a lesson being 2 cents) and foods are not wasted; (2) children of grade-school age can not handle full quantities successfully, pans are too heavy, and stirring large mixtures too difficult, and (3) small quantities show inaccuracies more readily than large quantities, hence principles are more readily checked up.

The second and third points may be questioned, as in many cities sixth, seventh, and eighth grade pupils in squads are successfully preparing luncheons in small family quantities, with better results than by the small-quantity teaching.

While these arguments may apply to sixth and seventh grade girls, eighth grade girls seem strong enough to handle full quantities. To increase their work would necessitate additional utensils of regulation size and a market for the cooked food to avoid waste and equalize expense. Grade schools have no lunch rooms. Foods cooked are eaten by the pupils. Tasting of foods is used whenever possible to teach children to eat wholesome foods which they scorn or have not had at home.

The aim of domestic science in the grades is to give general knowledge of cookery and food principles and appreciation of food values. This aim is also stated for the high school course, but in the grades the children are younger and the time for instruction limited; hence instruction is much more elementary and lessons simpler. Instruction is given for use in the home, and although home work is not required nor credit given for cooking done at home as a result of school instruction, the children are encouraged to put each lesson into practice and report to the teacher.

The aim of sewing courses in the grades is to teach fundamental processes such as stitches, seams, hems, and fancy stitches for deco-

¹ Based on 38 school weeks.

rative purposes. In the sixth and seventh grades, emphasis is placed on processes and in the eighth on simple garment-making. The outlay for sewing materials in the grades is from 60 to 80 cents a pupil each year. Most of the product is made for the pupils' personal use. Materials are chosen by pupils with the help of the teacher and purchased through the school or brought from home.

The grade schools have 33 domestic science and domestic art centers in use and two additional cooking centers are being installed. Of these, every week, ten accommodate 10 classes each; one $9\frac{1}{2}$ classes; four 8 classes each; nine 6 classes each; one 5 classes; six 4 classes each; one 3 classes; and one 2 classes. These classes total $229\frac{1}{2}$ a week, or an average of 6.9 classes for each center a week, which is about two-thirds their capacity. Although sewing centers are used by more classes than kitchens, recitation periods are shorter and are used less than full capacity.

Equipment of kitchens in the grades is the same as in the high school, except that cooking utensils for the individual equipments of the grades are one-portion size.

Several grade schools have dining rooms for serving meals. In others dishes for serving foods are part of the regular equipment.

In September, 1915, the program for instruction in domestic science and domestic art in elementary schools was changed. These subjects are now alternated by semesters throughout the sixth, seventh, and eighth grades. Lesson periods are now two hours for cooking for the 7A and 8A classes and one and one-half hours for the 6A class, with two hours for sewing for all classes. The school authorities point out that the number of hours just stated represents only the minimum given in domestic science and art, as pupils may elect to spend more time after regular school hours. This change of program not only reduces the time allotted for instruction in these subjects, but scatters the instruction over a much longer time with long lapses between lessons and between courses.

This plan has been introduced to do away with certain features of the former plan by which instructors of domestic art and domestic science constituted a floating force moving from building to building. By the new arrangement, each instructor teaches in one or a very few buildings, and thus becomes identified with the teaching force and with the neighborhood.

This change has caused considerable discussion among teachers of domestic science and domestic art. The survey can only point out that to carry out the new plan teachers of domestic science are being required to teach domestic art and teachers of domestic art to teach domestic science, and, in some cases, general subjects as well. It is to be hoped that this division of teachers' time is only temporary, as, in the opinion of the survey, much better results are attained when

the time of the special teacher is given to work for which she has special knowledge and experience.

Sewing and cooking have little subject matter in common. It is generally conceded that combining the two subjects in one course, as is the custom in some cities, makes for scattered work and less efficient standards than separate courses under special teachers.

Practical chemistry, teaching food values, balanced diets, proper combinations of foods, chemical and cleansing qualities of things in common use, antidotes for the wrong use of such things as ammonia, use of disinfectants and antiseptics, might well be correlated with domestic science. The study of color, color harmony, attractive and economical home decorations, textiles, and retail shopping, good linen, and hygienic and comfortable dress is domestic art. Physiology, hygiene, sanitation, and cleansing processes belong to both.

It is practically impossible to get teachers qualified in both lines of work, as it means virtually preparation for two professions, with practice, technical preparation and teaching ability in each. To carry two subjects so diverse means divided time, divided responsibility and divided loyalty.

HOME ECONOMICS COURSES IN THE HIGH SCHOOL.

Home economics in the high school includes courses in domestic science and domestic art. Domestic science includes cookery, household science, household management, marketing and dining-room service, and laundering. Domestic art includes sewing, dressmaking, textile study, applied art, home decorations, home furnishings, and millinery. Instruction in cleansing processes and spot removal is also given. These subjects are required for a four-year course in home economics, and either domestic art or domestic science courses are elective for girls taking the general and commercial courses. Pupils recite in the same classes, and no differentiation is made in the work to meet the aims and ability of the two groups. In the last school year 1,099 pupils were in cooking and 1,038 in sewing courses.

There are no records to show how many are pursuing these branches as a major subject and how many as an elective. By this arrangement first-year pupils with little instruction and experience are frequently in classes with girls who have had two or three years of high school instruction in the subjects; hence there are serious differences in age, experience, and ability, as well as in aim, which tend to make the instruction less effective.

Domestic art and domestic science courses alternate by semesters throughout the four years. Cookery and household science classes meet on alternate days during the first semester, and sewing, applied art, and millinery on alternate days during the second semester each

year, making two full years in cookery and science, and two full years in sewing, applied art, and millinery. Excluding time spent in passing back and forth between classes and in washing dishes and setting the kitchens in order, each pupil "majoring" in home economics receives 71 hours' instruction in science and 71 hours' instruction in practical cookery each semester, and for the four semesters of the high school course, 284 hours in each of these subjects. The same amount of time is given to domestic art courses.

The equipment of school kitchens is uniform. Each kitchen has 24 individual equipments, each consisting of table space, one gas burner, one portable oven, family-size cooking utensils, knives, forks, spoons, and other small utensils, two gas ranges, one demonstration table, one refrigerator, stationary sinks, and storage space; also dishes and silver for serving. Kitchens, with one exception, are in the basement, but are light and well ventilated. The average cost of equipment per kitchen, including plumbing and stationary fixtures, is about \$700.

The equipment in sewing rooms consists of table space for 24 girls with drawers and lockers, sewing machines, dress forms, pressing boards, and fitting rooms. Tables are 31½ and 32 inches high, or 2 inches higher than the regulation dining or reading table, for convenience in cutting, but as this work occupies not over 25 per cent of the class time the tables are not sufficiently comfortable or useful most of the time. Sewing rooms with one exception are located in the basements. Light and ventilation are good, but with one exception rooms are overcrowded. The cost of sewing-room equipment for each high school is \$600 to \$700.

The five high school kitchens and sewing rooms are each used four and one-half hours a day for three class recitations, two in the morning and one in the afternoon. This totals 22½ hours a week or 855 hours a year.¹ Each class accommodates 24 pupils, or 144 pupils a week, as classes recite on alternate days. The same number may be accommodated in the domestic art courses.

Supplies for cookery are furnished by the school and sewing materials by the pupils. Usually staple foods are purchased in quantity by the school, and perishable foods by the teachers except for special meals when the pupils do the marketing. Materials for sewing classes such as nainsook, long cloth, and toweling are bought at wholesale and sold to pupils at cost. Other materials for dresses and waists are brought from home.

Courses are uniform throughout the five high schools. The course is planned by the supervisor, but the teachers have some freedom in deciding what subject matter may be used for each lesson. Varia-

¹ Based on 38 weeks.

tion in the course or individual work is determined to some extent by the neighborhood in which the school is located.

The aim of the domestic science courses is to give a general knowledge of cookery and food principles and an appreciation of food values and comparative costs. These courses are planned for use in the home. Cooking or other housework done at home is reported and discussed in class, but no school credit is given. A few pupils have been prepared for and during vacations have occupied positions as waitresses. This work if related to school lunch-room instruction may be made to interest many girls in this and other branches of home economics.

Individual recipes have been abandoned for full-quantity cooking. All high schools began last February to teach cookery on the family-quantity basis. The original program of lessons was adhered to, but each pupil prepared a five-portion quantity. Foods prepared in these classes were sold to the school lunch room and served as part of the regular luncheon. Receipts covered cost of food materials used by the classes. This plan reduces cost of cookery approximately \$1,000 a year.

Each high school has a large cafeteria with a well-equipped institutional kitchen for preparing foods in large quantities. These accommodate 800 to 2,000 persons. Simple, wholesome foods, prepared by classes and by practical cooks are served at a minimum cost.

The combination of the classroom and the lunch room promises to solve a serious problem in teaching cookery. The preparation of five-portion recipes in the classroom makes it possible to have theoretical work practical. Standards attainable only through repetition and experience may be gained in the school lunch room, kitchen, and dining room if the pupils work in squads according to a schedule arranged in advance so as to give variety as well as repetition. The school lunch rooms are not as yet used for instruction purposes, but plans are being made for so using them.

Proximity of science laboratory to kitchens in North and South High Schools effects a desirable correlation. Science and cookery teachers cooperate in keeping the practical and theoretical work parallel and thus make both immediately useful. Where laboratories and kitchens are placed in different parts of the building co-operation is more difficult and instruction probably less effective.

Instruction in domestic science is good technically and has progressed with home needs, though teachers find difficulty in completing some lessons in the periods allotted. Preparation of foods can not be hastened without risking quality. When class periods are not fully occupied with the actual cookery lessons, general instruction in

theory, rules for table and dining-room service, hygiene, and sanitation are given. This work is important and is regularly planned.

The aim of domestic art courses is the planning, cutting, and making of garments for individual and home use, and the selection, making, and decorating of household furnishings for school and home. Emphasis is placed on construction and application of art in design, color, and decoration of garments and other articles. The usual series of exercises is used, each girl furnishing her own material, chosen, as a rule, in consultation with the teacher. Two semesters are devoted to mending, making underwear, study of materials, and applied art, and the next two to household furnishings, dresses, and waists. Girls are encouraged to make garments at home, and this gives them opportunity to apply methods for garment making learned in school.

The time allotment to an article in both grade and high school is too high. This is a common fault in other places. In planning courses to enable all pupils to complete the work in a given time with due allowance for instruction in theory, the number of articles to be made has been set at the minimum. Sewing courses should set standards of speed as well as workmanship and should be so arranged as to give slower pupils opportunity to complete the work and at the same time not restrict those with ability to do more work than is scheduled. This can be accomplished by setting a minimum amount of work for credit and a maximum with extra credit for each garment made, thus enabling those who have the ability to qualify "as efficient home makers or prepare for entrance into culinary occupations or the needle trades."

The plan in use for the correlation of art and sewing courses by applying designs with proper stitches and colors in the class is especially good. Application of the design to the article for which it is intended is essentially art, the making of the stitches being a smaller part of the problem than the colors, the design and its suitability for the purpose. This correlation may be still further effected by having the art and dressmaking departments in close proximity. Dressmaking is also very largely a matter of art, and close cooperation between the departments should result in more artistic garments and more practical work for design classes, but wasting time in work for the sake of using design should not be allowed.

Instruction in domestic art is good from the technical standpoint. Greater emphasis on commercial sewing would be welcomed by some teachers who feel that better results may be obtained if the personal element can be made to give place to real interest in work. Last year seven babies' layettes as permanent models at the school and for use by the Infant Welfare Society, the State Art Society, and

the Woman's Club were made by the domestic art classes in each high school. From the standpoint of standards of work and interest in a product not for personal use, this first attempt in making commercial product was so successful that similar outfits are to be made and sold during the coming year. Making garments for customers or for sale establishes ideals and standards in sewing that can not be accomplished as effectively when made for personal use. The latter method emphasizes self-adornment; the former good workmanship measured by accepted standards and the working for others with enthusiasm.

Teachers of home economics are all college and technically trained women. Experience in the sewing trades is not required of domestic art teachers, nor is business or practical housekeeping experience required of domestic science teachers. Lunch-room managers are teachers, trained domestic science workers, and practical housekeepers. Requirements for these positions have not been standardized. Teachers of science are trained in domestic science. This requirement is made for the purpose of having teachers who appreciate practical science for housekeepers.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

Very little claim has been made that the courses in domestic science and domestic art in the regular schools are designed to prepare for the trades, or that pupils of these courses enter these trades to any extent as a result of training. The aim in the schools has been to give girls as part of general education some elementary training in domestic science and art because it has been considered a necessary equipment of every girl and woman, no matter what her future career may be. It is from this point of view, and with full sympathy toward it, that the domestic science and art work has been considered in the foregoing study.

In many respects good work is being done in both subjects and the defects and difficulties observed are common to the public schools everywhere. It remains to point out what some of these defects and difficulties are:

1. The work of the home economics courses in both grades and high schools should be broadened so as to include the development of neighborhood interests and activities. There are limitations upon the amount of practical experience that can be given in school, but this the home can supply if the teachers and the parents will cooperate. This cooperation can be furthered (1) by teachers visiting the families in the neighborhood and by working with such public bodies as the Visiting Nurses, Women's Welfare League, and the like; (2) by afternoon and evening classes for the mothers of the girls in

the school, brought about and planned in part through the visiting; (3) by popular illustrated lectures upon subjects of immediate interest and of use to the home people.

2. Attention is called to the need for adjustment of equipment. According to common experience, the sewing-room furniture is not suited to the height of the children. The tables and chairs are too high for any but the over-sized pupils. Tables should be 27 to 28½ inches high, and chairs should be of different heights, ranging from 14 to 17 inches. For hand sewing the chairs should be low enough for the knees of the worker to be level with or slightly higher than the hips. For machine work the chairs should be of regulation height, as machines are adjusted to such standards. Machine tables as now manufactured are too high for most persons under 15 years. This adjustment of chairs and tables is comparable to the adjustment of seats and desks in the regular classrooms, to which much attention has already been given.

3. It has been pointed out that the time allotment is too high for the best use of the pupils' time. Sewing courses to be effective should set standards of speed as well as workmanship, and to acquire these standards the work should be arranged to give the slower pupils time to complete it and, at the same time, not restrict those who have the ability to do more work than is scheduled at present. This can be accomplished by setting a minimum amount of work for credit and a maximum with extra credit for each garment made, thus enabling those who have the ability and desire to qualify "as efficient home makers or prepare for entrance into culinary occupations or the needle trades," as the high school course states.

4. Too little time is being given in 1915-16 to cooking and sewing in the grades to accomplish very much; 38 hours a year in sewing and 38 hours in cooking is, at best, a very short allowance of time for work where actual manipulative skill is to be taught. Furthermore, it practically excludes the scientific and artistic principles of the subjects. When these hours are distributed over a period of 19 weeks, the situation is even less promising. It is recognized that the numerous demands upon the school curriculum, time, and budget make this problem in large part an administrative one. More time is certainly needed to get results that count for much in better home making. The survey is strongly of the opinion that the present limited number of hours could be used to better advantage if they were not scattered over so long a period.

5. From the statements of the teachers of domestic science and art in the various high schools it appears that the present facilities for these subjects in some of the schools are inadequate to meet the demand for the training. There is probably as great an interest in these subjects on the part of the high school girls as can be found any-

where, and wherever additional classrooms and equipment are needed they should be provided to meet and foster this interest.

6. The lunch rooms of the high schools present an opportunity, of which advantage has not been taken, to enable the girls in the domestic science classes to get experience in cooking on a larger scale, an experience proving of such benefit in the Girls' Vocational High School. If, however, close correlation of work with the lunch rooms is to be successful, it is important that girls taking training in the lunch rooms be under the direction of trained and experienced persons.

7. There is a growing feeling that it is a mistake for the pupils in such practical work as manual training, cooking, and sewing to spend all their time in making things for their personal use. Much of this is desirable, but there are certain ethical and social gains in school work connected with a product of marketable value that can be utilized in the school system or sold.

GIRLS' VOCATIONAL HIGH SCHOOL.

The school was opened in December, 1914, with an enrollment of 256 girls. Seventy-four were in the dressmaking, 40 in the millinery, 83 in commercial and salesmanship, 37 in home making and junior nursing, and 22 in the catering and nursing courses.

Each course is supplemented with related and general academic subjects, art, and physical education. Day courses are planned for two years or more, according to preparation and ability of pupils. One year of service in the trades for which pupils were trained will be required before school diplomas are granted.

The object of the school is to give practical training, to prepare for employment, and to extend the general education for girls who do not care to or can not take the four-year high school course. Pupils must be 14 years old and have completed the sixth grade, except that those completing the eighth grade before that age may be admitted. Pupils entering the commercial and junior nursing courses must have completed the eighth grade.

One-half of the school time is given to practical work in the vocational subject elected, including art, and one-half to academic courses and physical education. One vocational subject is chosen after pupil and parents have conferred with the principal.

The school makes a commercial product in all handwork departments. Sewing classes make school furnishings, aprons and caps for cooking uniforms, and "middy" blouses and bloomers for the gymnasium; also garments of stock sizes and for individual orders. Hats and millinery novelties are made by millinery pupils for stock and custom orders.

Class kitchens of the high school type are used for regular instruction in theory, and foods cooked by the classes are sold in the school lunch and tea rooms. Other foods required for luncheon for 60 to 70 persons daily are prepared in the lunch-room kitchen under the direction of a teacher and two women helpers.

Girls serve in squads and class credit is given for the work, which is planned to supplement the classroom instruction so as to develop skill in the application of theory. Full-quantity recipes are used. Girls "majoring" in cookery courses obtain practical work in dining-room service in the school tea room. Fourteen special dinners for from 28 to 200 persons were served by these pupils.

Salesmanship pupils sell stock garments, hats, and foods in the school salesroom, thus getting experience in showing goods, making sales slips, wrapping packages, and making change. Commercial pupils do stenographic work and typewriting for the school.

Plans for extending the work of the day school include courses in garment making on electric-power sewing machines, a day nursery for practical work in the junior nursing course, expansion of the dressmaking and cooking departments for advanced work, and a model department for practice in housekeeping and home decoration.

Evening courses will include extension courses for housekeeping and business women seeking instruction in their trades and household arts course for women desiring instruction in making their own clothes and hats. These plans have been shaped, in some measure, by the developments of the survey.

Equipment in this school is practically the same as in the other high schools. The class kitchens and sewing rooms are of the type described under "Home economics in the high schools." The lunch-room kitchen is equipped with up-to-date machinery and utensils. The suggestion as to height of chairs and tables under sewing-room equipment in the high schools applies also here. Electric-power sewing machines for garment instruction are to be installed this coming year; also an additional class kitchen, a sewing room, a model apartment, and a day nursery.

Practical business experience is required of teachers of vocational subjects. Each is a specialist in her line. There are 12 teachers of vocational subjects and one trade assistant in dressmaking. The two commercial teachers have had college and business courses and practical experience; the salesmanship teacher university training and practical experience as a saleswoman; the three cooking teachers technical training and housekeeping experience; the millinery teacher practical training and experience as a millinery saleswoman; and the two teachers of sewing professional and technical training, but no trade experience, although such experience is desirable. The teacher of dressmaking is an experienced tradeswoman. The two

academic and art teachers are professionally trained and experienced teachers, but have had no business or trade experience.

Experience shows that teachers of academic subjects do more effective work when they have real interest and actual practice in the trades taught. This practice may be acquired in the school work-rooms, and business experience during vacations may contribute materially to an appreciation of the vocations and their demands.

Teachers of trade subjects need to keep informed of trade demands by constant visits or periods of experience in business establishments, and to keep in touch with current trade news through trade journals, which may help teachers of academic subjects as well.

The need for this type of instruction has already been demonstrated, although the Girls' Vocational High School has existed only five months, and the pupils' response to the work gives promise of attaining its aims and ideals. It was recognized at the outset that commercial and nursing courses could be given successfully only to girls who had completed the eighth grade, and only those were enrolled. No age or educational requirements were set for salesmanship courses, but the work thus far indicates a need for higher age and educational requirements than those demanded for other courses.

Cookery courses for home cooking, catering, invalid and children's diet, and the school lunch room have drawn many pupils. The classroom instruction is planned to give sufficient practice for necessary theory, supplemented by intensive practical work in the lunch-room kitchen and dining rooms. This correlation of classroom instruction and cookery in the lunch-room kitchen has been successful enough to warrant the installation of a second class kitchen to carry out still further this method of instruction. Work in the latter kitchen will be scheduled so as not to prolong one task beyond the point of value to the pupil.

The millinery workroom connects directly with the salesroom, and meeting customers and trying hats on them is part of the course. It is doubtful if any but a few selected girls should be admitted to this course on account of short seasons and uncertain employment.

Dressmaking offers several alternatives for graduates. Minneapolis has a large number of first-class dressmaking shops employing 10 to 50 workers each, and alteration and dressmaking departments in department and specialty stores employ many skilled sewers. The demand for experienced workers practically always exceeds the supply. This department will be materially increased in scope as pupils become proficient in sewing and handling different kinds and qualities of fabrics.

Salesmanship offers unusual opportunities to girls and women. There is great demand for young women educated and partially trained for salesmanship, and for older women to fill positions as assistant

buyers and buyers. Girls in a class now in training have practical work in meeting customers and selling goods in the school sales-room, to be supplemented by experience in local stores during holiday seasons and special sales. This work will be reported upon by employers and school credit given. Retail stores have expressed their desire to cooperate in this work.

Pupils in the junior nursing course look forward to employment as nursemaids. Since they are to take care of small children, only reliable and fairly mature girls having an eighth-grade education were admitted. A general course in plain and invalid cooking, preparation of foods for the baby, plain sewing, hygiene, and academic subjects is given. This is being supplemented with practical work with children in a day nursery, and the school anticipates cooperation with hospitals for further practical training.

Trade art courses have not yet been developed beyond the point of correlation with the vocational subjects. There is a limited demand for trade art in such lines as illustration for advertisements and posters, but practically no demand for costume designers outside of dressmaking shops where most designing is done in cloth. Specific art instruction which develops taste is a large factor in dressmaking, millinery, and home decoration, and to this end courses are being developed.

Academic studies are correlated with vocational subjects. The scheme, however, recognizes the need for still closer correlation of subject matter and follow-up work on the part of academic and vocational teachers to see that related subject matter is put into use.

Practical courses in textile study are coming into importance. No related subject taught in vocational schools is so rich in historical, cultural, and girls' industrial interests as the study of fabrics. A knowledge of this subject is very essential in all the sewing trades, millinery, and home making, and to some extent in salesmanship and nursing. It must be taught largely from the customer's point of view, however, and has been difficult to teach, as until recently textbooks dealt almost exclusively with technical and scientific methods of manufacture. The customer's greatest interest and need for information relate to a wide range of materials with their different uses, fastness of dyes, and durability of weaves, as well as the characteristics of pure wool, linen or silken fabrics, and mixed fabrics.

A most efficient method of teaching textiles from this standpoint is to begin with commercial names, kinds, widths, prices, and qualities of standard fabrics and how to recognize them, points which may be learned by handling a variety of materials. This quickly shows need for further study of cloth manufacture as to preparation of fibers, kinds of yarns, types of weaving, and dyeing, adulteration, and finishing processes. By emphasizing their contribution to the

finished cloth rather than the technicalities themselves, the student acquires a sufficient background for intelligent buying and use of fabrics.

The school has a good opportunity for developing trade extension courses for workers in garment trades, millinery, dressmaking, alteration work, salesmanship, waitress work, and catering. These pupils should be grouped by trades according to their qualifications and experience.

Extension courses for home workers as described in Chapter XXII should also be provided in the afternoon and evening. Especially qualified teachers, understanding the interests and needs of the home workers in these classes, may make them of real value to the homes of the community.

Evening courses in household arts for women wage earners seeking instruction in sewing, millinery, and cookery for personal and home use, by careful grouping of pupils and by live teaching, may be made to serve a genuine demand and need.

The vocational school has unusual opportunity to establish some well-defined type courses which will indicate the type of class work, the group, the course to be covered in a given time, and special methods required for teaching pupils who seek such instruction after the long day's work. It is also in position to develop real interest in public lectures on health and sanitation, family income, purchase and care of foods and clothing, prevention of contagious diseases, and other subjects.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

Agreements have been made for this school with employers in the department stores, the garment industries, dressmaking and millinery which are discussed more fully in the chapters on these occupations and in Chapter XXIII on cooperation between the schools and the trades. These agreements provide for a three-month probation period for the girls desiring preparation in these lines in order to test their interest in and fitness for the work. Those who are thus selected give the rest of two school years of 10 months each to further preparation for their chosen work, after which they are placed in the trade as workers for a third year, diplomas not being given until proof of satisfactory work at the close of the year. All pupils so trained are to be paid not less than \$8 a week. A committee made up of employers and employees from the trade is to assist the authorities in standardizing the work so as to insure proper training.

At the conferences for the different trades taught in the Girls' Vocational High School courses of study were worked out and approved by the trades and are now being taught by the school.

It is impossible to pass any final judgment upon the work of the Girls' Vocational High School, which has been in existence less than a school year and which has not yet graduated a class from its two-year courses. In the opinion of the survey, the school has been planned along right lines. Considering the quarters in which it is being carried on and the length of time it has been in operation, the institution has done its work better than could have been expected in the circumstances.

The bulk of the suggestions and plans for the trade training for girls growing out of this study and the conferences held in connection with it have been adopted by the school and are now being organized and developed as part of its work. The close and sympathetic understanding among the principal and teachers and the workers on the survey have proved, in the opinion of the school and the survey, beneficial to both. The following suggestions with regard to the work of the school, which have been touched upon in the foregoing statement, are offered here in more positive form:

1. The present quarters of the Girls' Vocational High School are poorly adapted to the purpose. While undoubted advantages have come from starting the school in a very simple and experimental way, the attendance and the work done already indicate that the school is to have a permanent and important place as an educational institution in Minneapolis. Every consideration requires that a better plant and better equipment be provided soon.

2. In the opinion of the survey, much of the success of the school depends upon its teachers. Teachers of trade processes should, without exception, have trade experience and, wherever possible, technical preparation as well. Teachers of technical subjects should have an acquaintance with the trades in which they are to be used. Teachers of academic subjects should have an acquaintance with the occupations followed by girls and women which will give them a sympathetic understanding of the problems and demands made upon the working girl. Teachers already employed in the school without these qualifications should be required to get them. As has been pointed out, the Girls' Vocational High School has already acted on these ideas more generally than many of the other girls' trade schools in the country.

There is danger in any large public school system that the more or less rigid and uniform standards and requirements set up for the work of the regular schools may be applied in the selection of teachers for vocational work, so as to lay too much emphasis upon academic rather than practical assets. In Minneapolis, or elsewhere, standards in the selection of teachers in vocational schools should be made flexible, if necessary, in order to obtain the best results. This may

require rules and regulations entirely separate from those used in the employment of teachers for the so-called regular schools. It should be said here that the Minneapolis school authorities fully realize this and have already taken steps in this direction.

3. Advisory committees have been formed to assist the school in giving training for salesmanship, commercial work, dressmaking, millinery, the garment industries, and junior nursing. These trades and occupations have agreed to use the school as an apprenticeship training place and source of supply for new workers. Probably no other girls' vocational school ever had a greater opportunity to make itself a necessary part of the trade training of girls in a city than has the Girls' Vocational High School of Minneapolis. Whether it will hold this advantage gained by the survey depends very largely upon the way in which the school authorities and the advisory committees cooperate in the task of making the work of the school truly educative both for life and for a vocation. These advisory committees are the expression of interest and willingness of the trades they represent to make the school an effective agency for apprenticeship training through the trade understandings established. They undoubtedly have contributions to make by the way of suggestions to the school authorities, who must finally determine courses of study and methods of instruction. The plan will succeed very largely in proportion to the extent to which the school authorities recognize and use the help which the trades are able to give.

COMMERCIAL EDUCATION IN THE PUBLIC SCHOOLS.

IN THE REGULAR HIGH SCHOOLS.

This section represents a study made by a special committee of Minneapolis citizens, whose names are given in Appendix A.

Commercial training in Minneapolis is given in commercial courses by the five public high schools and the Girls' Vocational High School, by 12 private business schools, by two Catholic schools, and by the University of Minnesota in its extension courses.

Eight years ago the five regular high schools recognized commercial education as one form of vocational education it was their duty to give and established four-year courses, which have been continued and developed. In December, 1914, a two-year course for elementary school graduates was established in the Girls' Vocational High School. No such course has as yet been established for boys.

The commercial training is of a very high order and compares favorably with similar courses in other cities. Furthermore, there has been steady improvement in this work from the beginning. This study has been undertaken with full recognition of the excellent results accomplished for students able to give four years to a regular high school

education and preparation for business life. Its main purpose was to learn what improvements and enrichments could be made in the present four-year course and what reorganization was needed to meet the requirements of those who can not give four years to commercial training.

In 1914-15, 1,605 pupils were enrolled in the commercial courses of the regular high schools, and 1,600 attended the private business schools of the city, of whom 60 per cent, 960, were residents of Minneapolis. The high school pupils were distributed as follows: Freshmen, 576; sophomores, 439; juniors, 298; seniors, 292. From all the graduating classes 210 students went into the business world. It was impossible to obtain an accurate statement as to the withdrawal of commercial students from all the high schools. Two were unable to give figures as to freshmen, and one was unable to give any figures. To get an estimate, the figures from the schools able to report were divided by the number of reporting schools and multiplied by 5, the total number of high schools.

This estimate showed withdrawals as follows: Freshmen, 189; sophomores, 80; juniors, 115; seniors, 10. Out of every 100 pupils pursuing these courses, 24 withdrew, while out of every 100 pupils pursuing all high school courses 16 withdrew. This seems to indicate that pupils in business courses drop out much more frequently than college preparatory students, and that the commercial courses should be arranged to give definite preparation in such practical subjects as stenography, typewriting, and bookkeeping earlier in the course for those who can not give four years to further education.

A uniform curriculum is prescribed for all schools and the work is not supervised by one expert. The senior teacher is head of the commercial department and leads in creating and carrying out plans. The addition of a general supervisor of commercial work would undoubtedly result in an equal standard for all schools and in certain improvements, but there is equal justification for adding a supervisor for English, French, and other special subjects, and this is not practically possible.

The teachers with whom this question was thoroughly discussed believe that such a system would lessen initiative and consequently interest in their work. They think that if the business course is made a closely correlated unit and cooperation developed among commercial teachers the same improvement in standard would be accomplished by a happier and less expensive method. It was suggested, on the other hand, that a superior teacher who could instruct in teaching practice might be very useful. Such normal training will be especially necessary in future as commercial teachers are drawn more and more from the business world on the basis of experience rather than knowledge of teaching methods.

Six teachers in each school on the average teach commercial subjects. There is no departmental organization of subjects, teachers, or pupils for other than practical work. Pupils of the commercial course recite as a separate group to a special teacher in all subjects relating to business. Other subjects are pursued in regular classes, under regular teachers, with pupils taking college preparatory work.

The four-year course of study for commercial students of the five regular high schools, as given in the prospectus, follows. Subjects in black-faced type have a bearing upon commercial work:

FIRST YEAR.

FIRST SEMESTER.

English I.
Penmanship I.
Etymology and Spelling.
Elementary Algebra I.

SECOND SEMESTER.

English II.
Penmanship and Spelling II.
English Grammar or Algebra II.
Commercial Arithmetic I.

SECOND YEAR.

English III.
Commercial Arithmetic II.
Commercial Geography I.
General History I.

English IV.
Elementary Bookkeeping (2 periods).
Commercial Geography II.
General History II.

THIRD YEAR.

English V.
Commercial History I.

Select two {
Stenography and Type-writing (2 periods).
Advanced Bookkeeping.
Modern Language.
Botany I.
Physics I.
Plane Geometry I.

English VI.
Commercial History II.

Select two {
Stenography and Type-writing (2 periods).
Accounting.
Modern Language.
Botany II.
Physics II.
Plane Geometry II.

FOURTH YEAR.

Business Correspondence.
Civics.

Select two {
Stenography and Type-writing (2 periods).
Modern Language.
Industrial History of U. S.
Chemistry I.
Advanced Algebra.
English Literature I.

Business Composition and Literature.
Commercial Law.

Select two {
Stenography and Type-writing (2 periods).
Modern Language.
Chemistry II.
Solid Geometry.
English Literature II.
Economics.

The difference between the commercial course and the other courses is for most subjects one of arrangement rather than subject matter. All the high school courses are so planned that pupils in the vocational courses, by taking only a minimum of vocational subjects and

electing a larger number of college preparatory subjects, may meet the entrance requirements of the university.

Except for one year's work in mathematics, which must be taken in addition to the regular commercial course, pupils who have taken all the commercial subjects offered are admitted to the university on graduation. Since only part credit is given for practical subjects, a commercial student wishing to enter the university must emphasize electives drawn from the academic course. While only one out of 210 graduates of the commercial course last year is attending the university, the course is so planned as to make it possible for any student to qualify for college entrance.

No electives are permitted for the first two years of commercial, Latin or modern language courses, although pupils may choose some of their subjects in the domestic science, art, manual training, and general courses. Except bookkeeping, stenography and typewriting, business arithmetic and business English, only allowed in the course called "commercial," all other subjects, and they are the majority, are required or elective in the course called "general."

A commercial student may sit beside a college preparatory student for the first three years in every class but one and during the fourth year in two out of four classes. He may be graduated as a commercial student and never take any practical business work except a half year of business arithmetic, a year of spelling, and a half year of bookkeeping. If he leaves school at the end of the first year, he has as practical preparation only a drill in penmanship and a half year of business arithmetic; if at the end of the second year, only this and a brief training in elementary bookkeeping.

He has, however, opportunity to choose a course giving excellent equipment for business. To do this, however, he must in the last two years choose commercial instead of college preparatory subjects.

A statement approved by all principals of the high schools says that the "commercial course" is not regarded as a college preparatory one. It reads:

The commercial course as outlined by the school authorities serves a twofold purpose. The idea primarily is to prepare the student for active business life. But a student who avoids the purely technical commercial subjects and makes a careful selection from the optionals allowed may so nearly meet the requirements of the University of Minnesota as to enter the university with but little additional study. Very few commercial graduates do enter the university, however, and the course is not looked upon by the students as preparatory to college.

This statement also covers the question of credits that students of the commercial course must have to enter the university:

The typical commercial student making the usual choice of subjects can not enter the University of Minnesota at all unless he carries at

least one full year additional of academic work. For, of the required subjects in the first two years, the university gives no entrance credit for the year of penmanship, the year of etymology, spelling, and English grammar, the year of general history, and only half credit for the year of commercial arithmetic. On the other hand, the university will accept for entrance four credits from the group known as "vocational subjects." This group includes two units allowed for bookkeeping, two units allowed for stenography and typewriting, one-half unit for commercial law, and one-half unit for commercial arithmetic, or five possible units for technical commercial subjects, of which four may be presented for entrance. Therefore, the student carrying the complete technical course, including bookkeeping, stenography, and typewriting, as outlined in the course of study, will secure nine and one-half units credit toward his graduation from high school, of which but four will be accepted by the university.

Such student must also carry three years of academic English and one year of business composition, correspondence, and office practice. (Under a liberal interpretation of the university requirements, this last year's work has been allowed as a fourth year of English.) He is also required to complete one year of commercial geography, one year of commercial history, and one-half year of civics, all of which are accepted by the university. This leaves for him a slight margin, varying according to his choice, for academic subjects, but in any case he will be short one year's work for college entrance, where a liberal allowance for vocational subjects is made, as in the case of the University of Minnesota, and short two years' work or even more, where no such allowance is made.

In all the schools typewriting suffers because it is not valued like other subjects. A credit is a semester's work of five hours of recitation a week, or ten hours' laboratory work and practice. Typewriting receives only half a credit each semester for three semesters, and a full credit only in the fourth. Shorthand and typewriting count as one subject and, since the course calls for four each semester, students of stenography must carry three subjects besides typewriting and shorthand. This makes it impossible to require two periods of regular practice on the typewriter for the first three semesters, and pupils get full practice only by giving extra time to it.

Many stenographers and teachers think typewriting more difficult than shorthand; almost every commercial teacher agrees that far too little time is devoted to it. They favor two periods a day for four semesters in typewriting, giving a full credit as for any other subject, if such a system of measurement continues advisable.

Certain important subjects are omitted from the course which the modern business world believes should be included. Typewriting seems as necessary as elementary bookkeeping. Success in modern business requires elementary training in such important things as salesmanship, advertising, banking, and knowledge of local business conditions and problems. Furthermore, since the days when the stenographer's notebook, the typewriter, and the ledger were all the

new commercial worker had to understand the use of, many devices have been introduced which business men think the newcomer should know how to handle before going to work. Among these are the comptometer, dictaphone, adding machine, stenotype as a substitute for stenography, multigraph, addressing machine, billing machine, telephone, and telephone switchboard.

The equipment of each school includes typewriters of at least three kinds, mimeographs, and, with one exception, some kind of filing system. The efficiency of the equipment depends on the amount of use it receives and the amount of practice afforded each student. Since no school has more typewriters than it needs, the efficiency of each machine is very high. Practically all are used every period except one, and during that period and also before and after school a large proportion are in use. The mimeograph is largely used in practice work rather than for regular assignments, and both this machine and the filing equipment would be used more if greater emphasis were laid on practical work. The amount of typewriter practice has already been considered. An increase in the efficiency of the course inevitably involves a double amount of the practice now required.

Teachers differ somewhat regarding the increase of equipment. Three schools advocate introducing an adding machine, one a multigraph, one a stenotype, and one an Elliot-Fisher biller. One commercial teacher objects to the adding machine on the ground that students get little practice in addition, and with the machine would depend less than ever on their own ability. Though many of these machines require only a short period of instruction, all, with the addition of the calculating machines, increase the practical knowledge and mechanical skill of office workers. As yet the filing equipment is not complete, because training in office filing has only recently been added to the student's equipment.

The cost of buying supplies, new equipment and material, and of keeping up old equipment in all the commercial departments was \$3,500 last year. The increase of equipment necessary to make a sufficiently practical course in new modern office devices involves the question of expense, especially since the commercial courses are divided among five high schools. Should the cost of installing complete outfits in each high school be too burdensome, the difficulty could be met by installing them at a central place, or they could be sent from school to school like traveling libraries. Doubtless some manufacturers would be glad to lend them for educational purposes.

Classroom arrangement and space are, in the main, good. Light and ventilation are varyingly good, North and Central High Schools having the best. The best arrangement in the bookkeeping depart-

ment, already provided by three schools, includes permanent drawer or locker space for ledgers, paper, and ink for each student.

The training of all the teachers in the commercial courses extends beyond high school. Of the 25 instructors, rated as special commercial teachers, 15 are university graduates, 4 having had training in a business school; 9 are graduates of a normal school, 7 having had special university or business college courses, or both. One other teacher has taken university and business college courses.

Not many commercial teachers have had much commercial experience. Including as it does selling insurance, practice of law, and management of private property, their business experience differs little from that of teachers in academic courses.

The standard for commercial teachers adopted by the board of education, April, 1915, is as follows: "Required—either college education with proper emphasis on the subject to be taught or high school education plus four years approved study; or high school education plus two years study above high school grade, plus four years approved business experience." A teacher must also have two years successful experience in teaching, unless willing to be appointed as an apprentice teacher to serve as an assistant.

It would be possible under these requirements to teach commercial subjects without special commercial training or actual business experience, and there is no indication that teachers with the approved amount of business experience are to be preferred to those academically trained. It is only fair to say, however, that preference is being given to candidates with actual commercial and office experience.

Salaries for special commercial teachers totaled for all high schools \$35,667 in 1914-15. The total is \$40,000 for 1915-16. The minimum, paid to one teacher, was \$800. The general minimum is \$1,200 and the maximum \$1,700.

The method of teaching in the commercial courses is excellent. Any criticism of it must allow for the difficulties due to the present loosely knit course and to the fact that many teachers not required to have business experience are expected to prepare business students. If the commercial course were closely welded together, it would produce better results. For instance, a teacher in business correspondence could, in a unified department, correlate her work with that of the teacher of shorthand dictation so that there would be harmony and not confusion of ideas.

Although there are differences in the interest aroused by different instructors in treating the same subject, generally those who have been in business can stimulate their students to the best effort, keenly aware as they are of the sharp standard of efficiency demanded in a real office. It is not enough that the content of a subject should be

well taught. That content must be of practical value to the student. Every teacher of bookkeeping, for instance, should know what the application of his teaching is going to be, and how much detail is necessary for a boy or girl about to enter a modern office, where at present there is so much subdivision of labor.

It is the belief of the survey that the classroom work, in quality and quantity and the conscientiousness of the teacher, compares favorably with that in any other commercial school in the country. It is the expressed opinion of business men and women, however, that greater correlation between different subjects and greater practicality in teaching them are needed to make more effective the excellence of the high school commercial work.

Practical commercial work has been introduced into three high schools. From principals in grade schools and from teachers and different departments in the high school, work is accepted which can be done by the commercial classes. This consists of tests, questions, announcements, songs, writing of business letters, typewriting outlines, memoranda, programs, etc. At certain periods a good deal of this is done. One school is working out a complete system of checking and crediting this practical work for each pupil. This is effort in the right direction. Every school needs to have practical work and to make it systematic and continuous. Two schools supplement such effort by sending pupils in their last year to offices under the board of education, either in the city hall or in part-time schools. Here they do general office work, for which they receive no pay, but which is credited to their record.

As soon as this is systematized so that every graduating pupil has opportunity to do this work and definite reports are returned to the school, the public schools will have excellent devices for giving practical experience to students and for testing their ability. The difficulty is that there are not enough places in the department of education for all to get actual office experience. Some scheme will have to be worked out by which such experience may be afforded in business offices of the city.

The amount of time given to practice work in the commercial course seems small. All effective vocational education requires much actual practice, with training in theory, to realize the best. At present the high schools open at 8.30 a. m., and close at 2.15 p. m., with half an hour for lunch. The regular classes are in session only five and a quarter hours. The school day is divided into seven periods of 40 and 45 minutes each. Each student devotes four periods to recitation and three to preparation of lessons or to practice work.

Commercial students have the same hours and time allotments as pupils in other courses. The regular commercial course gives no business practice except drill in penmanship during the first year.

In the second year two periods a day (80-90 minutes) are given in elementary bookkeeping for a half year, a total of 30 hours a month, equivalent to less than 4 eight-hour days a month, or 18 eight-hour days for the year. Graduation from the commercial course is possible without any other training in principles of accounting.

Third-year pupils who elect stenography and typewriting give one period a day to each of these subjects for the entire year. In regular classes they practice dictation only a little over 3 hours a week, 12 hours a month, 120 hours a year, or 15 eight-hour days—one-half a month in a modern office. The same holds true in typewriting. Furthermore, it is possible to be graduated from the commercial course without any additional training in these branches. A good deal of time, however, is spent by some students in voluntary practice before and after school, and they may elect to give the same amount again in the senior year to the same subjects, thus doubling the amount of practice. In general, senior students get about as much practice as students in the six-month course of the private business college.

A responsibility in helping its commercial students find office positions is felt by each school. There is no systematic placement department, but the principal and the commercial teachers place many pupils and give valuable assistance to others. This they accomplish by personal calls upon employers, by calls received from employers, and by the use of typewriter companies and employment agencies. Each high school professes to place all its graduates, and there is evidence that these graduates find places with ease.

The success of the placement work has been very marked, considering the handicaps. The teachers have no time to investigate individual places. If the schools send pupils to typewriting companies, they realize that the students will be sent to whatever places are offered, regardless of their kind. The service of calling on employers and of telephoning for places for the commercial course graduates comes out of extra time given by busy teachers and is a great burden on some. As the schools grow, this burden becomes heavier and the need of a central employment exchange is increasingly felt. While placement is now fairly satisfactory, in the future some other means will have to be provided, with adequate follow-up records of those who have been placed, to help individual students to the right work and to test the success of the school courses.

The aim or purpose of the course is to give both high school and commercial training to boys and girls able to spend four years more in school after finishing the eighth grade. This is well expressed in a bulletin giving courses for 1913-14:

The commercial course is arranged to give the studies which will fit young men and young women to go into commercial positions as

stenographers, bookkeepers, or general assistants in office and clerical work. Many young people leave school before they come to the high school and go into this kind of work; but these boys and girls who leave at the end of the seventh or eighth grade usually find, after they have worked a few years, that they are at a disadvantage because they have not had a more thorough training in English and a better general education. There are many positions which will not be open to them because of this lack of general education. The high school commercial course, extended through four years like other high school courses, has been arranged to meet the need which is felt for a course which will give the young people who take it more general intelligence and a good general education, as well as knowledge of those studies which will enable them to get positions promptly and earn money after graduating from the high school.

Thus far the high schools have made little provision for the many young people who can not or do not take the four-year course in the secondary school. While high schools turn out a group of highly selected, well-educated, promising boys and girls, they have thus far left to private business colleges the commercial training of the type of pupils making up the great bulk of commercial workers, who must either go into office service entirely without training or get it at personal expense.

This situation has been partially remedied for girls by the establishment of two-year courses in the Girls' Vocational High School, open to graduates of the eighth grade. The work of this school will be described later. Not even this provision has as yet been made for boys.

The present four-year course has a large justification as far as the more fortunate boys and girls are concerned. The catalogue of the high school says:

The bookkeeping and the shorthand and typewriting are given during the last two years of the course, because it has been found that these studies can be more easily mastered and a better knowledge of them obtained if the students have had a thorough training in English and in other branches given in the first two years of the course.

On the other hand most pupils who enter commercial work do not take the four-year course in the high school and, therefore, the courses thus far offered do not benefit them. The day may come when every youth will have a high school education as well as special preparation for commercial or other work, but when in such an excellent school system as that of Minneapolis less than one in three pupils enrolled in the eighth grade remain to be graduated by the high school that day seems far removed, and entrance requirements and courses should be governed accordingly. In every vocation there are levels of service, and therefore levels and degrees of preparation for the service. It is the purpose of a democracy to train all kinds of men in all kinds of ways and for all kinds of things.

Some also believe that to hold children in school a course must offer no definite training for wage earning short of the third year in high school, for fear they may go into business and use it, and not finish their general education. This policy disregards the fact that at the end of the freshman year about one out of three, and at the end of the sophomore year one out of every two pupils has dropped out without any preparation for useful work; also the fact that only one out of three who enter high school remains to finish, and more than 20 per cent graduated from elementary schools do not enter high school at all. Many of these go to the private business college where they meet pupils who have dropped out of the lower years of the high school.¹ Nor does it take into account that in 1914-15 approximately 384 pupils withdrew from the commercial course in the high schools, during freshman, sophomore, and junior years. Most of them undoubtedly went into the commercial field.

Special training in office efficiency should be given in the last year. Students should not use devices for speed and accuracy until trained in basic principles, but near the close of the last year, at least, they should be made familiar with devices in common use. In this the advisory committee may be of great help. The advisability of using miniature offices depends partly upon the age of the student. If it is a question of using "make-believe" offices rather than nothing at all, it would be preferable to use them, but practical experience with real office work is far better.

A knowledge of the slide rule for making calculations is useful in many offices. The local survey committee has recommended that the telephone companies work out some method of instruction in use of the switchboard, voice training in handling numbers, efficiency methods of answering the telephone, telephone technique, and salesmanship. The mechanics of the typewriter—cleaning, oiling, and minor adjustments—is a necessary part of instruction in its use. The use of banking forms, drafts, indorsements, and the like, must be given every pupil whether he takes the bookkeeping course or not. Finally, the office practice and drawing courses should be correlated so as to teach every office worker how to use the simpler drawing instruments, make maps, do lettering, ruling, etc.

The value of such a course in office practice is not alone to give familiarity with any article or device, but to give a method of getting information and of using every short cut making for efficiency. To know what real estate designations mean and how to use plats and a city atlas; to know how to use city and telephone directories, gazetteers, trade and financial directories, such as Dun's and Brad-

¹ The enrollment in the eighth grade for all the schools in 1910-11 was 3,454; in 1911-12 the freshman class in the high schools had 2,315; in 1912-13, the sophomore class 1,715; in 1913-14, the junior class 1,254; in 1914-15, the senior class 1,111. The approximate ratio of these figures remains about the same for the last five years.

street's; to be able to get information quickly about mail, express, and freight service and rates, and draw up checks and money orders; to know the location of cities, streets, and important buildings, and the use of blue prints, zinc etchings, map mountings, etc.—these are some of the suggestions given by business men for training in expert office efficiency.

No advisory committee of business men has been established to help the high schools standardize their training and adapt it to actual business demands. Thus far their contact with business men has been entirely through the commercial teachers, who are already busy and can not give much time to extra school work. A means of meeting this need is suggested by the recommendations of the local survey committee for commercial education, namely, that the board of education appoint an advisory committee, including employers and employees in offices, which will inform the schools of changes in office organization affecting questions of training, and which will offer suggestions about equipment and practical work.

An attitude of flexibility and experiment is expected of an institution preparing youth for life and work. In a course preparing for commercial work, which is comparatively new in the school system and has to meet with constant changes in practice, it is important that no crystallization of method shall obstruct the free play of new ideas. Therefore, although present commercial work in the high schools is excellent in many ways, suggestions for improvement based on a study of the vocation itself undoubtedly will have the support of all progressive teachers.

Greater freedom in testing themselves must be given pupils in the elementary schools, in order that when they choose commercial training they may do so more wisely.

Since the schools must meet the needs of all young people, they should introduce a short intensive business course for those who can remain only one or two years. Those able to take a 4-year course should gain not only technical skill, but a broad view of business by which they can gauge its opportunities more intelligently, and that general information which creates the power to make an infinite number of adjustments. The vocational teachers must have this wide outlook on business and practical experience in meeting the demands of business to give their students ability, initiative, and training. The high school principals favor the introduction of 2-year courses, explaining that the delay in introducing these courses has been due in the past to overcrowding by those desiring the regular work.

During their final months of work commercial students should be given practical office experience that will test their business ability and give them opportunity for adjustment to actual conditions of work. The schools must have constant contact with business through

an advisory committee, and must provide in night sessions business courses that will give the training necessary for advancement to young people already at work.

To summarize this treatment of the present commercial training:

1. For the limited group that gets the four years' training the course is excellent.

2. Only one out of two new workers from the high schools going into business each year gets four years' training.

3. Two-year courses are needed for the large group who go to private business colleges without entering high school, or drop out of the lower years of high school before reaching the instruction in typewriting, shorthand, and bookkeeping of the last two years. This is particularly true of boys, since such a course for girls has been introduced into the Girls' Vocational High School.

4. The accumulation of credits for college entrance needs to be subordinated to the vocational idea of thorough preparation for the large opportunities of commercial work.

5. The present work of the 4-year course needs more intimate contact with actual business life and practice.

6. No study of vocational training can fulfill its obligation that does not emphasize the value of a high school education. The investigation of office work in Boston and Cleveland shows that, except in special cases, girls with high school education advance farthest in wage and responsibility. Therefore, short courses should be offered only to pupils who can not spend four years in high school.

The Girls' Vocational High School was opened December, 1914. It offers five courses, one in commercial work. This school was organized to give training for wage earning to students unable to remain four years in high school, and to give practical work to pupils demanding that rather than academic education. The aim of the commercial course is frankly experimental, to see whether in two years of intensive work it can adequately prepare students to earn a living in office work. The value of this experiment to the educational system in Minneapolis can hardly be overestimated.

The total enrollment in the commercial work was 85 in 1915, including special students, 65 being in the regular course. Only one grade of work was undertaken, since no pupils would be ready for the second-year work until January, 1916. Entrance requirements are, for the commercial course, a minimum age of 14 and completion of the elementary school. Many girls are over 16. Two or three students below the eighth grade were at first accepted but were unable to keep up the work.

There are three special teachers for business subjects, supervised by a principal, and, although other special studies in the course are taught by six different teachers, the commercial students are kept

together as a group. The three commercial teachers have had high school education plus special training, one being a university graduate. All have had some business experience.

The two-year course of study includes salesmanship, bookkeeping, shorthand, typewriting, English, civics, hygiene, office training and practice, physical training, cooking (once a week), and arithmetic and penmanship for those weak in those subjects. In the second year the students are expected to specialize further. The bookkeeping course aims to give elementary training in principles with a little practice in applying them. More advanced work may be given in the second year to girls who wish to specialize in this subject.

In the correlation and intensiveness of its commercial course the Girls' Vocational High School has decided advantages. Since the hours are from 8.30 a. m., to 4 p. m., about 80 minutes can be given four times a week to both stenography and typewriting, amounting to $5\frac{1}{2}$ hours a week, $21\frac{1}{2}$ hours a month, or 24 working-days a year. It also offers the same opportunity as the regular high schools for extra practice on the machines outside of regular hours.

The equipment is far from complete, except in typewriters, but improvement in this is only a matter of time. Practical work, especially during the summer session, has been done for the school and Dunwoody Institute by the typewriting students.

While the initial work and spirit of this school is to be highly commended, it is too early to judge either of the methods or results, especially since a year and a half must pass before any student can complete the course.

RECOMMENDATIONS OF THE COMMITTEE ON COMMERCIAL EDUCATION.

The committee for the survey of commercial education has received and accepted the foregoing report on the work of the public and private commercial schools in Minneapolis. The report is based on data which have been gathered for the Minneapolis vocational survey and which is available to anyone who wishes to investigate the source of any statement.

The private commercial school as an institution has been and is rendering valuable service to the community and the committee desires, first of all, to express its recognition of this fact. However, as the report shows, there are at present too many private commercial schools for the needs of the city. Their competition for pupils results, for certain schools, in a low standard of instruction and lack of careful selection of pupils. Considering the fact that these organizations are designed to fulfill an educational need without being under public control, it seems wise and just that a definite

standard be established and maintained, with proper supervision by some public-spirited organization, like the Civic and Commerce Association, cooperating with the Association of Business Colleges which has approved the findings of this report.

The committee feels, as stated in the report, that the present high school commercial course, excellent as it is in many respects, does not fulfill the needs of that large percentage of students who do not remain four years. The committee also finds a lack of correlation in arrangement; therefore, it recommends that the entire commercial course be reorganized and that a two-year intensive course be introduced. It also believes that more emphasis should be placed upon obtaining teachers who have had practical experience in business life, and that they should be encouraged, if not actually required, to keep abreast of changing business conditions by continuing their practical contact. In view of the fact that commercial graduates are to take places in the business world, the committee recommends the organization of an advisory committee, composed of high-grade practical business men and women, both employers and employees.

In all conferences held by the survey with employers and employees from the business world, there was, of course, a recognition of the very great need for the proper technical training of the commercial worker. In practically every instance, however, there was an agreement upon the statement that there was at least equal need, if not even greater need, in business to-day of certain habits of work and mental attitudes toward work which are as necessary as technical training, if not even more so, for the success and advancement of office employees.

Many persons possessing admirable technical knowledge fail to apply this knowledge in their daily work to the greatest advantage to themselves and to their employers, because they have not acquired habits of expressing themselves in terms of painstaking attention, system, order, neatness, punctuality, and accuracy. It is perhaps even more true that many fail to make anticipated progress because they do not bring to their tasks certain mental attitudes which express themselves in terms of ambition, loyalty, initiative, self-confidence, and willingness to assume responsibility.

Much as the business world realizes the need of these habits and mental attitudes, the large majority of business concerns have few, if any, suggestions to make as to the way in which these habits and attitudes are to be developed. Most of them have failed to inaugurate in their own establishments any plan for insuring them, although a few have been conspicuously successful in so doing.

So far as habits are concerned, the committee believes that much may be accomplished both in the school and in the office by insistence on more rigid standards in the performance of all work. System and order are gained in proportion as pupils and employees are required to use system and order in planning of work, in arrangement of material, in the use of proper filing devices and to be prompt in execution of tasks. There is practically no means of teaching neatness and punctuality except by requiring their constant practice.

Accuracy is a habit developed largely by the refusal to accept anything else. The committee believes that the schools can do much in this respect by adopting and causing to be used at all times the most modern methods and devices for checking and verifying work. While the schools have done commendable things along this line, the committee believes that the firm refusal either to graduate or to place students in commercial courses who have not met high standards in proper habits of work tested in practical ways would tend to eliminate much of the present dissatisfaction of the business world.

It is no less important that employers should give more attention to the careful selection of office employees, to insure the entrance into office work of such persons only as show some progress in the formation of proper habits. The employer needs also to give more attention at the very outset to the careful instruction of new employees in the desired methods of performing the routine of their tasks, and to insist upon high standards of neatness, promptness, and accuracy in their discharge. It is recognized at the same time that no rules and regulations for the work of employees should be carried so far as to rob the worker of initiative.

Even more important is the question of the mental attitude of the worker toward his work and its opportunities. The committee recognizes that the development of such qualities as initiative, self-confidence, willingness to assume responsibility, loyalty toward employer, and ambition for larger efficiency and success is responsible in a majority of cases for any pronounced success in the business world, yet it recognizes, too, that these qualities are much more difficult to impart or to inculcate than habits of doing work.

The committee finds, however, that progressive business concerns have been addressing themselves to this problem with at least some small measure of success. The committee, therefore, recommends that all business schools, private as well as public, give special study to these efforts and to all other methods which have proved helpful in achieving proper mental attitudes toward work as well as toward life, to the end that such methods as far as possible be incorporated into the system of business training.

MINNEAPOLIS PUBLIC EVENING CLASSES.

For several years public evening classes have been conducted in the elementary and high school buildings, giving instruction in academic, recreational, industrial, commercial, and household arts subjects. This report deals only with the last three. No attempt has been made to go into the development of evening classes further than to ascertain that during the last three years the amount and character of the work has remained fairly constant, so the analysis of the work of 1914-15 presents a record of progress made as well as its present condition.

Of 6,000 students in all subjects, 457 took industrial, 786 commercial, and 1,242 household arts courses, a total of 2,485.

The industrial classes offered training in mathematics and plan reading, estimating, show-card writing, electricity, mechanical and architectural drawing, sheet-metal drawing, cabinetmaking, and machinists' work. Domestic science, millinery, sewing, dressmaking, and art needlework were offered in the domestic science and art courses, while the commercial classes gave instruction in salesmanship and advertising, typewriting, shorthand, and bookkeeping.

The evening schools for 1914-15 were in charge of a director employed during the day as principal of an elementary school and able to give only a small portion of his time. This year the work is in charge of an assistant superintendent of schools. A week was given last year to preliminary registration before the classes opened. A fee of \$1 was collected and returned when the books and unused material were turned in at the close. In his report the director recommended that this fee be forfeited for nonattendance or indifference. Practically no additional equipment was provided, only those facilities used in the day schools being afforded. The work was greatly hampered by lack of locker rooms. No shopwork could be given in other than day-school lines. Evening classes for tradesmen require modern shop equipment, such as is found in the commercial shop or factory. Except for the facilities of the manual training shops of the high schools, this equipment has not been furnished for any classes.

Equipment for domestic science was reported inadequate, as not every class should be taught to cook in small quantities, and group instruction for adults is impossible without larger utensils.

No definite standard of qualifications for teachers of industrial classes has been set. In general, those teaching trade subjects had had trade experience in them. The director of the school engaged as competent persons as he could get for \$2.50 a night. This wage he declared to be the greatest handicap to the work, because the persons whom he would choose would not serve for it. The same fee is paid for instruc-

tors in domestic science and commercial classes, almost all of whom are teachers of similar subjects in the regular schools.

The courses given were full-term courses, general in character. Thus, the course in cabinetwork, running for 45 nights, gave elementary instruction in general cabinetmaking to 37 persons from eight occupations, none of which was cabinetmaking. The night school was in session 21 weeks, four nights a week. Not all the classes began or closed at the same time. They closed according to amount of work desired and varied according to the kind of attendance developed and number of nights a week given to each. Sessions varied from 81 nights for bookkeeping to 20 nights for some domestic science classes. On account of the mixed character of the classes only elementary instruction was given in many subjects, and therefore did not meet the needs of specific and advanced training for tradesmen. The methods of instruction were those usually employed in such general evening courses.

The analysis of the public evening vocational classes which follows is based upon returns for these classes during 1914-15, as filed in the office of the board of education. The figures have been difficult to interpret because of the variety of record attendance kept by various principals and the wide variation both in membership of classes and in time given each week to different practical subjects.

The session of the evening high schools for 1914-15 was divided into three periods of 40 minutes, so that the same pupil could take bookkeeping, shorthand and typewriting, or some other subject, all in the same evening. Some pupils went for only one period, taking only one subject one night a week. Most classes did not accommodate the same group more than two nights a week. In domestic science and domestic art pupils attended only one 2-hour session a week. "Number of sessions" means number of times during the year that a given subject was taught.

The figures in the three tables which follow represent the best interpretation of the records that could be made after repeated conferences with the public school authorities. The survey believes they give a fairly accurate picture of the situation as to the points covered.

TABLE 6.—ANALYSIS OF INDUSTRIAL COURSES, 1914-15, IN THE PUBLIC ELEMENTARY AND SECONDARY EVENING SCHOOLS OF MINNEAPOLIS.

Item.	Shop mathematics.	Manual training (2 classes).	Plan reading and mathematics.	Estimating.	Show-card writing.
Total number admitted.....	24	119	34	20	28
Average attendance.....	10	44	15	11	9
Attendance:					
1 to 5 nights.....	8	23	9		9
5 to 10 nights.....	1	29	3		8
10 to 15 nights.....	3	13	4		4
15 to 20 nights.....	2	12	1		
20 to 25 nights.....		14	4		
Over 25 nights.....	10	28	14	7	1
Number of classes.....	1	2	1	1	1
Number of sessions.....	62	96	39	36	39
Occupations:	Machinist..... 11 Sheet-metal worker..... 1 Laborer..... 3 Bookkeeper..... 1 Blacksmith..... 1 Boiler maker..... 2 Teamster..... 1 Foreman..... 2 Unemployed or not stated..... 2	Agent..... 2 Butcher and grocer..... 4 Cigar mfg..... 2 Clerk..... 19 Driver..... 4 Mechanic..... 4 Messenger..... 8 Printer..... 2 Teacher..... 9 Cabinet worker..... 2 Miscellaneous..... 12 Unemployed or not stated..... 51	Carpenter..... 24 Plasterer..... 3 Bricklayer..... 2 Sash and door clerk..... 2 Sheet and metal worker..... 1 Railroad clerk..... 1 Salesman..... 1	Brickmason..... 12 Laborer..... 1 Foreman..... 1 Unemployed or not stated..... 6	Shipping clerk..... 4 Salesman..... 2 Painter..... 3 Window trimmer..... 2 Upholsterer..... 1 Sign writer..... 1 Bookkeeper..... 2 Mail clerk..... 1 Adv. solicitor..... 1 Clerk..... 1 Unemployed or not stated..... 10

1 One for each occupation. It was impossible to give in some of the columns each occupation followed by one student only.

TABLE 6.—ANALYSIS OF INDUSTRIAL COURSES, 1914-15, IN THE PUBLIC ELEMENTARY AND SECONDARY EVENING SCHOOLS OF MINNEAPOLIS—Continued.

Item.	Electricity.	Mechanical and architectural drawing.	Sheet-metal drawing.	Cabinetwork.	Machinists.	Free-hand drawing.
Total number admitted.....	45	56	13	37	53	28
Average attendance.....	10	12	8	21	10	6
Attendance:						
1 to 5 nights.....	16	13	2	7	15	5
5 to 10 nights.....	4	11	2	3	14	13
10 to 15 nights.....	6	5	4	6	9	2
15 to 20 nights.....	8	5	4	1	4	2
20 to 25 nights.....	3	12	5	20	5	4
Over 25 nights.....	8	2	1	1	7	2
Number of classes.....	2	3	1	1	2	1
Number of sessions.....	79	73	43	45	77	41
Occupations.....	Electric Co..... 11 Sash & Door Co..... 1 Telephone..... 2 Lin. Linen Co..... 1 Engineer..... 2 Mr. E. Remington..... 1 Mr. B. Shade Co..... 1 Nat'l. Bk. Co..... 1 Nat'l. Bk. Co..... 1 Meter tester..... 1 Carpenter..... 1 Clerk..... 2 Messenger..... 1 Unemployed or not stated..... 19	Office work..... 3 Stock keeper..... 1 Carpenter..... 11 Machinist..... 10 Student..... 1 Larders worker..... 1 Electrical worker..... 1 Tinsmith..... 1 Wholesale..... 1 Plumber..... 3 Draftsman..... 1 Clerk..... 1 Surveyor..... 2 Unemployed or not stated..... 13	Sheet-metal worker 10 Boiler maker..... 2 Structural-iron wkr 1	Office work..... 10 Carpenter..... 2 Draftsman..... 1 Physician..... 1 Teacher..... 3 Student..... 3 Machinist..... 1 Upholsterer..... 1 Unemployed or not stated..... 15	Machinist..... 34 Clerk..... 7 Cement worker..... 1 Carpenter..... 1 Metal worker..... 1 Foreman..... 1 Printer..... 1 Paper factory..... 1 Factory foreman..... 1 Student..... 1 Unemployed or not stated..... 1	Office-clerical..... 1 Draftsman..... 1 Class painter..... 4 Coning..... 2 Bundle wrapper..... 2 Housekeeper..... 1 Division assistant..... 1 Printer..... 1 Bookkeeper..... 2 Student..... 1 Unemployed or not stated..... 12

TABLE 7.—ANALYSIS OF COMMERCIAL COURSES, 1914-15, IN THE PUBLIC ELEMENTARY AND SECONDARY EVENING SCHOOLS OF MINNEAPOLIS.

Item.	Salesmanship and advertising.	Typewriting.	Shorthand.	Bookkeeping.	Shorthand and bookkeeping.
Total number admitted.....	75	175	220	286	30
Average attendance.....	18	38	75	172	10
Attendance:					
1 to 5 nights.....	6	10	44	30	4
5 to 10 nights.....	18	14	30	37	5
10 to 15 nights.....	15	21	26	41	4
15 to 20 nights.....	13	25	19	33	4
20 to 25 nights.....	6	10	16	27	1
Over 25 nights.....	17	57	59	88	12
Number of classes.....	2	4	4	4	1
Number of sessions.....	44	80	200	274	61
Occupations.....	Office work..... 10 Salesman..... 6 Collector..... 2 Specialty salesman..... 19 Stenographer..... 3 Cigar mfg..... 1 Printer..... 1 Watch repairer..... 2 Plumber..... 1 Machinist..... 1 Brakeman..... 1 Telephone lineman..... 2 Draftsman..... 2 Miscellaneous..... 1 Unemployed or not stated..... 23	Journalism..... 2 Teacher..... 1 Office worker..... 60 Printer..... 3 Draftsman..... 2 Musician..... 1 Housework..... 14 Machinist..... 2 Photographer..... 6 Salesman..... 2 Seamstress..... 5 Sheet-metal worker..... 1 Student..... 1 Miscellaneous..... 4 Unemployed or not stated..... 69	Bookkeeper..... 7 Office clerk..... 82 Stenographer..... 11 Timekeeper..... 1 Saleswoman..... 2 Dressmaker..... 2 Elevator operator..... 1 Electrician..... 16 Factory..... 2 Waitress..... 1 Student and tchr..... 2 Laborer..... 3 Housework..... 2 Miscellaneous..... 3 Unemployed or not stated..... 86	Bookkeeper..... 15 Housework..... 5 Errand boy..... 3 Machinist..... 3 Printer..... 2 Salesman..... 22 Stenographer..... 19 Teacher..... 2 Clerk..... 9 Factory..... 2 Milliner..... 3 Laborer..... 2 Student..... 4 Miscellaneous..... 25 Unemployed or not stated..... 118	Stenographer..... 3 Clerk..... 5 Teacher..... 8 Bookkeeper..... 11 Artist..... 1 Salesman..... 1 Tailor..... 1 Student..... 1 Printer..... 1 Unemployed or not stated..... 1

1 Average attendance for three classes.

2 One for each occupation.

TABLE 8.—ANALYSIS OF HOUSEHOLD ARTS COURSES, 1914-15, IN THE PUBLIC ELEMENTARY AND SECONDARY EVENING SCHOOLS OF MINNEAPOLIS.

Item.	Household arts courses. ¹				
	Domestic science.	Domestic art.			
		Millinery.	Sewing.	Dress-making.	Art needle-work.
Total number admitted.....	552	271	256	93	70
Average attendance.....	215	96	91	22	16
Attendance:					
1 to 5 nights.....	96	38	52	23	10
5 to 10 nights.....	123	53	55	17	4
10 to 15 nights.....	74	56	48	10	2
15 to 20 nights.....	56	51	12	10	1
20 to 25 nights.....	21	23	18	10	53
Over 25 nights.....		1	21	23	1
Number of classes.....	25	7	10	2	1
Number of sessions.....	368	196	337	91	42
Occupations.....	Bookkeeper.....	5	7	1	4
	Stenographer.....	32	26	11	9
	Teacher.....	26	8	3	
	Housework.....	70	66	69	11
	Clerical work.....	14	16	14	50
	Waitress.....	7			1
	Saleswoman.....	32	2		3
	Dressmaker.....	19	4		1
	Factory work.....	18	7	4	12
	Personal service.....	0	1	5	1
	Nurse.....	6			
	Student.....	1	11	16	1
	Telephone oper.....	16	1	5	
	Miscellaneous.....	6	1		
	Unemployed or not stated.....	125	81	90	35
					7

¹ This record does not include the following classes: Seward School (records not turned in)—1 class domestic science, 1 class sewing; Holland School, distribution of attendance and occupation.

The customary poor attendance in evening classes of the same general character is shown by the tables. Out of 2,485 enrolled there was an average attendance of 809 students, or less than one out of three. In the industrial classes, where 457 were enrolled, an average of only 156 attended, a little over one out of three. Out of 786 in the commercial courses, an average attendance of 213 was maintained, a little over one out of four. Out of 1,242 in the domestic science and art classes, 440 were in attendance nightly, or about one to three.

A great many students left within the first five nights. Out of 457 students enrolled in the industrial classes, 107, or about one out of four, remained less than five nights after paying a fee of \$1 for books and material. So with 94 out of 786, or one out of eight, in the commercial classes and 219 out of 1,242, less than one out of five, in the domestic science and art classes. Only one out of four remained over 25 nights in the industrial classes, less than one out of three in the commercial classes, and less than one out of 12 in the domestic science and art classes. Apparently many left the work from disappointment as to the instruction.

The trade extension classes held their pupils better than the general classes. Classes in mathematics and plan reading, estimating, and sheet-metal drawing, giving direct instruction relating to the trades, not only drew most of their students from the trades, but held them longer, 41 per cent of the students in plan reading and mathematics, 65 per cent of those in estimating, 39 per cent of those in sheet-metal drawing, and 42 per cent of those in shop mathematics remaining over 25 evenings. The class for machinists, apparently the only exception to this statement, was really a general course in machine-shop practice where clerks, cement workers, firemen, printers, and farmers were mixed indiscriminately with machinists. Very significant is the poor showing of the general courses giving elementary instruction in the trades to mixed groups, mostly of members not engaged in trade. Only one out of the 28 students in show-card writing, one of four in the manual training classes, 18 per cent in electricity, 21 per cent in mechanical drawing, and 7 per cent in free-hand drawing attended as many as 26 nights. In the cabinetmaking classes, whose showing is comparatively good, the students made furniture for their own use and the desire to complete their projects held these through the course. The difficulty with these general industrial classes seems due to inability to give instruction meeting the interests and requirements of mixed groups differing as to occupations and motives.

No trade extension classes for women were conducted as such. While 77 out of 552 enrolled for domestic science were employed as houseworkers and waitresses, there were no separate classes for instruction. In the domestic science course were 14 occupation groups, largely stenographers, saleswomen, teachers, dressmakers, and factory workers, for whom instruction had to be of an elementary character. Only one milliner was enrolled among the 271 pupils in the millinery classes, only one dressmaker among the 349 in sewing and dressmaking, and none in related occupations among the 70 in art needlework.

It should be said that none of these classes in household arts was designed primarily for the trade or home worker. Although the courses were advertised as plain sewing, advanced sewing, fine hand-sewing, dressmaking, and art needlework, there is nothing to show that anything other than the pupils' desires to register for a course determined their grouping. The teachers feel that these courses ought to be organized so as to sift and group the students according to experience and qualifications.

Out of a total registration of 1,242 in domestic science and domestic art 747, or about 7 out of 12, were employed in occupations during the day in no way connected with the work taken in the evening

school. Many took these courses for recreation, or to learn to supplement their daily wage by the ability to make some of their own clothes and hats and to carry on their domestic affairs.

Since the aims and needs of these people are so different from those seeking trade extension work, every consideration seems to demand their separate grouping for instruction. That such a large proportion of evening school pupils is made up of these women shows that they have an earnest purpose and that there is a genuine social demand for the work. However, the teachers declare that in too many instances the attendance of women in evening schools is to get assistance in making one new garment or hat for personal adornment, after which they drop out. This accounts largely for the fact that attendance in domestic science and art classes is much poorer than in the commercial and industrial classes. This is no more true of Minneapolis than of evening schools everywhere.

At the same time many women attend these evening classes to add to their knowledge and skill along practical lines. This group deserves every encouragement and help. It is doubtful whether the money spent on the first group brings adequate social returns. It is admittedly difficult to separate the two types so as to retain the second and discourage the first. This end will be accomplished in a large degree, however, in proportion as the trade extension classes are planned to meet trade rather than personal needs. It is possible that the courses suggested in Chapter XXII on training the home workers will meet the needs of the women employed in the home when taught from the standpoint of her present needs and abilities.

In the commercial classes two distinct types of pupils were enrolled. About one in three was employed during the day in work for which he sought additional training. About two in three were employed in a variety of occupations and came to evening school to add some knowledge of salesmanship, advertising, bookkeeping, or stenography to their equipment, probably in most cases with promotion or change of position in view. There was no separation of these two groups for instruction; for example, the 15 bookkeepers enrolled in the evening courses in bookkeeping were scattered through four different classes in various parts of the city, where they took instruction with errand boys, laborers, and factory employees. The enrollment for each of the commercial courses was large enough to have made it possible to separate those with experience from novices and to group novices into separate classes according to previous experience and aims in taking the course. This difficulty will probably not be met until the establishment of uniform classes is abandoned, and careful grouping of pupils in more diversified courses is emphasized.

Three distinct types of evening school students attend the classes. There is the trade worker seeking advancement or promotion in his

trade by adding to his productive skill and technical knowledge. Only trade extension courses giving advanced technical instruction can hold and benefit him. Such courses are beyond the grasp of the novice, who must be dealt with in trade preparatory classes, separate and distinct from trade extension classes, and giving only elementary instruction. A third type is the large number seeking knowledge of subjects other than those of their occupation, not to become beginners or productive workers in new lines, but to add a promotional asset for the work in which they are engaged. For example, a number of clerks, salesmen, and bookkeepers took industrial courses, and many trade workers enrolled in commercial classes, each seeking a knowledge to fit him for the growing demands of his present position or for positions ahead of him.

Many workers seem to realize the necessity of business training as a factor in promotion, and commercial workers in manufacturing lines feel the need of a knowledge of mechanical processes and how to represent, plan, and estimate them. This seems to indicate the need of general courses in such commercial subjects as salesmanship, advertising, accounting, modern business methods, business economics and elementary typewriting, and of general industrial courses in free-hand, mechanical, and architectural drawing, plan reading and mathematics, cost estimating, principles of mechanics, and the transmission of power, industrial chemistry, industrial design, shop organization and management. Such courses would be beneficial not only to the office man, but also to the promising man in overalls who by this equipment rises to the rank of "noncommissioned officer," more fully treated in Chapter XVIII.

When the Dunwoody Institute was created it was understood that its work was to supplement that of the regular schools of Minneapolis and Minnesota. Since its buildings are to be located in Minneapolis, practically all the work of the institute thus far planned has been carried on in this city. At the outset hearty cooperation was established between the board of education and the trustees of the Dunwoody Institute. While there has been no formal agreement as to the work, there has been a tacit understanding that for the present the institute expected to confine its efforts to training boys and men in industrial and mechanical arts, leaving to the public schools all such training for girls and women and all other forms of vocational instruction for both sexes.

The institute conducts both day and evening classes. The evening classes are not for novices but are either trade extension or general promotional classes for wageworkers. The institute plans to give brief trade extension courses in a large number of subjects whenever an average attendance is maintained of 12 persons in occupations

to which the courses are closely related. General evening classes will also be conducted for those seeking promotion in industrial lines. No trade preparatory courses will be offered.

SUMMARY OF STUDY MADE BY THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

1. It would seem from the experience of the public evening classes conducted by the board of education that, if they are to discharge successfully the important task of extending the general and vocational education of the wage earners of the city, **they must have more funds at their disposal.** More funds are necessary properly to organize, equip, and teach classes already established and to extend the service of the evening schools to more people and to additional lines of work for which the survey has shown there is undoubtedly a large demand.

2. **The problems of the evening schools are perhaps more numerous and difficult than those of almost any other kind of schools.** These schools, therefore, require a different type of organization and supervision, and fully as much time and attention as are given to the day schools. Ultimately they should have the entire time of a director who can give all his attention to their development and administration. Better schools and equipment will bring better teaching and a more permanent, instead of an uncertain and shifting, teaching force. Continuous experience with the evening schools and continued study of the conditions and requirements of the wageworkers will result in courses better adapted to their needs. Wider and more carefully planned courses and higher standards of teaching will reach and hold larger numbers of young persons coming to the evening school for a more intelligent and serious purpose. Cooperation with the vocation, whatever it may be, can then make the evening class a recognized and invaluable part of the vocational education of the worker.

3. Evening school instruction is now being given by a number of public and semipublic institutions, such as the general extension division of the University of Minnesota, the public evening schools, the Dunwoody Institute, the Minneapolis Art Institute, the Y. M. C. A., and the Y. W. C. A. There have been occasional conferences between these bodies for the last four years and a general desire exists among them to coordinate their work. Economy of effort would require that before the opening of another school year there should be, as a result of joint conference, **a clear understanding and agreement as to the place which each is to fill in a program of evening**

school education for Minneapolis. This understanding should define the field of service of each for both general and vocational education. Only in this way can needless duplication of work be avoided and efficient cooperation be effected.

4. The survey seems to show clearly that the largest difficulty with the public evening classes has been their inability to give instruction of a kind to meet the interests and requirements of mixed groups coming from a variety of occupations with a diversity of motives. It would seem that a highly important step at present would be a careful study of the widely diversified experience, abilities, and aims of the student body of the evening schools, so as to group them more effectively for teaching thereafter.

5. Where the resources of the public evening industrial schools are limited it would seem advisable to lay special stress upon the effort to meet the needs of those already employed in occupations whose demands they seek to serve. All experience seems to show that the further training of wageworkers along the lines of their vocation brings better returns to the evening school than the attempt to give novices any considerable amount of helpful instruction for a vocation in the limited time available for evening classes.

6. It would seem that if evening school students are to be grouped for instruction according to such considerations as their day employment, their ability, their previous education, or their aims it will not be possible in the future to offer many uniform courses in different evening school centers. The better plan would seem to be that courses be organized according to the requirements of students and given where facilities permit. It is recognized that there are many administrative difficulties to be met which make this plan hard to carry out in some instances. However, the committee believes that many of these will disappear in proportion as the growing enrollment of the evening schools makes possible a more diversified grouping of students, and as the students themselves become educated to the idea of attending the class best adapted to their needs wherever it may be held rather than to patronize the closest evening school center.

7. There seems to be a very great need for the development of promotional classes in such general business subjects as salesmanship, advertising, principles of accounting, modern business methods, and business economics; and in such general industrial subjects as free-hand, mechanical, and architectural drawing, plan reading and mathematics, cost estimating, the principles of mechanics, industrial chemistry, industrial design, and shop organization and management. While the general extension division of the university has done a most excellent piece of work in the development of evening class instruction in these general business subjects, there is still a

practically undeveloped field of training in these subjects of a somewhat lower grade from the standpoint of previous experience and requirements which the evening classes of the public schools should develop.

The large attendance upon the evening classes in general industrial subjects at the Dunwoody Institute by promising and ambitious men fitting themselves for promotion and leadership on the technical and directive side of production shows the need for this type of instruction. So with the trade extension classes already organized. The committee believes that the teaching of most workers in the trades can best be done by short courses, each directed toward some need or demand of the shop. In this way, not only will the teaching be made more direct and practical but it will attract and hold the trade worker seeking an additional wage-earning or promotional asset.

In providing these evening classes to afford instruction of real promotional value to those in the trades, it is necessary not only to provide money, space, and teachers for such classes, but to keep in mind a number of considerations fundamental to their efficiency. Among these of first importance are the following:

1. Teachers for such classes should be carefully selected. They should have sufficient background of practical experience to understand thoroughly the needs of the student workers and the terms in which instruction should be given. Also, they should have magnetism, alertness, interest in the problem, and a personality that will command the respect of and stimulate those who come into their classes.

2. In order to obtain such men, it is essential not only that they be carefully selected but that sufficient remuneration be available.

3. If such classes are really to function as trade training, it is essential that some method of selection of student workers be kept constantly to the front. Such methods, in the case of most of the classes dealt with in this report, would center upon the condition that only those in active work in the trade be admitted.

4. Great care should also be taken to organize the matter of instruction so as constantly to present material of direct practical value to the man who is looking ahead for increased pay or advanced position.

5. In regard to teaching methods, it is of the utmost consequence that matter be presented in concise, objective fashion adjusted to the mental habits of the students. This means oftentimes that it is far better to present material not in the theoretically logical order, but in the psychological order that will result in the easiest and most natural assimilation by the students.

Trade extension courses for women in the trades seem to be generally needed. These should include, besides others, separate classes for saleswomen, dressmakers, milliners, and garment workers. These courses should be confined to persons already employed in these lines. The instruction should bear directly upon their trade work and the instructors should be experienced women in the trades taught. In the chapters of the report dealing with the women's occupations suggestions will be found as to kind of courses needed. Trade extension courses for home workers should, in the opinion of the trades, be given by afternoon and evening lectures and class instruction such as is suggested in the chapter on the training of the home worker. As in the other case, these classes should be limited to women employed in the home and prospective home makers.

CHAPTER IV.

TO WHAT EXTENT ARE OTHER AGENCIES MEETING THE NEED FOR VOCATIONAL EDUCATION?

In addition to the work of the public schools considerable vocational training of many kinds is given by other agencies. A complete chart of these is given at the end of the chapter. No attempt is made to describe the excellent courses offered in the regular classes of the university. Only instruction of secondary grade fitting for wage-earning occupations will be considered.

These agencies supplementing the public schools provide instruction for numerous occupations in industry, commerce, and personal service. One only, the university's general extension division, is supported and controlled by the State. All the rest are privately controlled. Only one, the Dunwoody Institute, is supported by endowment, controlled by a private board, and at the same time free to the public. All the rest, including the university's general extension division, are supported wholly or in part by tuition fees, except a few operated by corporations for their own employees. With the exception of the university extension division, the Y. M. C. A., and the Y. W. C. A., all charging tuition are on a private basis and are operated for profit.

These agencies range from small institutions having one instructor and a capital of less than \$500 up to the facilities of the university extension division, the resources of the Dunwoody fund and the correspondence schools.

GENERAL EXTENSION DIVISION OF THE UNIVERSITY OF MINNESOTA.

This division offers both correspondence and class instruction. While the correspondence work is recent and its development necessarily somewhat slow, an encouraging advance has been made over last year. Some new courses have been developed, and plans are under way for others. "One of the present problems is to convince the instructors who conduct the courses that a special point of view is necessary and that a particular method is required for conducting courses through correspondence."

In all, 183 students in the State did correspondence work, of whom very few were in Minneapolis. Only 11 took business subjects, the

other 172 taking purely collegiate courses. While the prospectus proposed instruction in shop mathematics, mechanical drawing, electricity and magnetism, direct and alternating current, heating and ventilation, strength of materials and elementary mechanics, no students took such courses.

A tuition fee of 50 cents a lesson was charged for all correspondence work, and 105 students sent in over four lessons each. The courses are open to all persons qualified to pursue them, and credit is given in the university courses for persons qualified to matriculate.

The registration shows that these correspondence courses are not a factor in vocational education for Minneapolis.

Their permanent field of service will probably be the smaller towns and rural districts. In offering instruction by correspondence the university realizes that this can never take the place of the teacher in the classroom, but that it does reach students who can not be served by regular or extension classes.

The extension classes of the university were carried on under two divisions—the agricultural and the general. The former was in charge of a director at the agricultural college, and gave instruction in agricultural subjects with which this report is not concerned save as to home gardening work set forth in Chapter XX.

In addition to other activities, the general division conducted evening classes in academic, business, and engineering subjects, in which there were 3,350 registrations for the two semesters by 2,508 different students. Of these 1,846 registrations were for business and 349 for engineering courses, the fees amounting to \$11,358.

Seventeen different courses in business were offered for Minneapolis, covering practice, procedure, advertising, banking practice, business correspondence, business law, cost accounting, elements of economics, principles of accounting, railroad traffic and rates, retail selling, and salesmanship. In the first semester 521 students took these, an average of about 30 to the course, their fees totaling \$3,236.50. In the second semester 20 classes gave instruction to 510 students, who paid \$2,298.50 in fees, a total for the year of \$5,535.

Students from Minneapolis took 13 different courses in engineering, as follows: Alternating currents, architectural design, elementary and intermediate and advanced, automobile construction, electricity (beginning), gas engines, heating and ventilating, mechanical drawing, reinforced concrete, design, shop mathematics, structural design and trigonometry. In all, 183 students, or 14 to each class, took the work and paid \$1,221 the first semester, while 129 attended 12 classes in the second semester and paid \$982.50 in fees, a total of \$2,113.50.

The rapid growth of these evening classes shows that their work has met the real needs of many dayworkers. The largest increase was in the business courses, where 746 more students were enrolled,

almost 70 per cent more than in 1913-14. The engineering classes gave instruction to 124 more, or 50 per cent over the previous registration.

The business courses seem to meet the desire for advanced training along business and commercial lines in Minneapolis, and supplement well the elementary courses in typewriting, shorthand, book-keeping, and advertising given by the public schools.

Excellent beginnings have been made with the engineering courses but they need to be greatly extended. The advanced instruction they offer will prepare exceptional men for leadership in trades and industries and supplement the trade extension work planned for the evening classes of the Dunwoody Institute. The respective fields of service for the two institutions should be determined soon.

CONCLUSIONS AND RECOMMENDATIONS OF THE SURVEY COMMITTEE.

It is to be regretted that the important work which the general extension division of the university has been doing in carrying academic, commercial, and industrial education to the people of Minnesota must be greatly curtailed during the next biennium because of the reduction made in its appropriation by the last legislature. The committee believes this to be most unfortunate in these beginning days of a forward movement in vocational education in the State. Through the evening classes of the division the university has a large opportunity and responsibility for introducing practical education, both in business and in engineering, into the various communities, where, seeing its need, the people may be induced to continue and enlarge it under the auspices of the public schools. A strong effort should be made at the next session of the legislature to obtain for the division the funds it needs to discharge this responsibility properly.

WILLIAM HOOD DUNWOODY INDUSTRIAL INSTITUTE.

William Hood Dunwoody, who died February 8, 1914, left a trust fund for the purpose of teaching industrial and mechanical arts free to the youth of Minneapolis and of Minnesota. While the buildings must be located in Minneapolis, the institute may carry on extension work anywhere in the State. The board of trustees has interpreted "youth" to mean anybody over 14 years old.

In December, 1914, a small beginning was made by the institute in temporary quarters in the old Central High School building. The institute plans to erect its own plant at an early date.

Day classes were opened in printing, woodwork, machine-shop practice, electrical work, automobile repair and construction, and drafting. For all these lines 167 were registered out of 473 applying, the facilities compelling careful selection and limiting of the number

admitted. Of the 167, only 6 came from outside of the city. Eighty-one had completed the eighth grade and 51 were over 16 and not attending any school. In all, 90 were over 16. The average age was between 15 and 16 years. Of the 473 applicants only 31 said they could remain three years, 14 four years, and 3 five years. Forty-six were in the high school, 192 had completed the eighth grade only, 158 the seventh grade, while 78 were scattered from the first to the sixth grades, inclusive. None was admitted who had not reached the seventh grade. For 1915-16 all new pupils must have completed the seventh, and those in the electrical and printing classes the eighth grade.

Only day classes were conducted for the first school year. Each boy received seven hours' instruction a day, half in shopwork and half in academic and lecture classes. Five 40-minute periods a week were given to mathematics, three to drawing and plan reading, two to English, three to science, one to hygiene, two to gymnasium, five to industrial history and civics, five to library and study, and two to chapel and chorus singing. On two Saturday mornings each month the boys visited shops with instructors.

The equipment was largely that furnished by the board of education from unused manual training equipment of the public schools. It was inadequate both in variety and quantity, but this was rapidly corrected by adding modern machinery and tools before the opening of the present school year. It has been necessary to use artificial lighting in the four basement shops.

The teachers of the academic work are all college graduates. Those giving technical instruction have all had practical experience in the industries. All the shopmen have been successful journeymen in the trades they teach. All but two of the seven are high-school graduates, two graduates of engineering schools, one attended college over two years, and one normal school one year.

The shopwork has been almost entirely commercial in character. The total value of the product from December 1, 1914, to July 1, 1915, was \$3,797.26. Of this, \$2,400.68 was produced by the print shop, which did all the printing for the public schools and the Dunwoody Institute. Practically all the work of all the shops was done for these institutions, except that of the automobile shop, which did repairing and overhauling of private automobiles amounting to \$280.37. Only work was solicited which furnished educational experience, and emphasis was laid on the opportunity for training.

The cost of instruction and materials for the school, deducting value of work done in the shops, was \$12,808.63 for the seven months. As there was an average attendance of 138 boys, the average pupil-cost was \$92.81; at the same rate, the average for a 10-month session would be \$132.60. On the basis of a total registration of 190 pupils, the per

capita cost for the 7 months would be \$67.40. As the school gives 7 hours a day, 5 days a week, 10 months a year, a total of 1,400 hours of instruction, the cost for each of the "average" 138 enrolled would be a little less than 10 cents an hour for all class and shop work taken together.

No facilities for the industrial training of girls have as yet been provided, although the board has interpreted the word "youth" to cover both sexes. The Girls' Vocational High School, giving trade training, was established by the board of education in the same building and at the same time that the boys' classes in the Dunwoody Institute were established. It has not been decided whether a part of the Dunwoody fund shall be used to give instruction in the industrial and mechanical arts to girls and women.

As the result of the survey, the trustees of the institute established certain new courses and made certain new arrangements for 1915-16.

The work for the current year includes all-day, part-time, dull-season, and evening classes, the all-day classes giving two-year courses as originally planned for the same trades in 1914-15, with the addition of sheet-metal work and carpentry.

The dull-season school will instruct apprentices and journeymen in bricklaying, plastering, painting, and plumbing. Through agreements and trade understandings already perfected with employers and approved by the unions for closed shops, apprentices from these trades will be required to attend the Dunwoody Institute all day for two months each year until they have completed their apprenticeship. A full discussion of all arrangements with the trades concerning the work of the school will be found in Chapter V on apprenticeship and Chapter XXIII on cooperation with the trades.

Evening classes are offered of two general kinds. Most will be trade extension classes for supplementary instruction to meet the trade needs of journeymen, apprentices, and helpers. For these classes students will be grouped by trades and instruction will be directly related to the trade. These trade extension classes will include the following trades and any others for which classes can be formed: Printing, machine shop, cabinetmaking, automobile repair and construction, bricklaying, painting, plastering, plumbing, steamfitting, stonecutting, baking, sheet-metal work, stationary and hoisting engineers, firemen, and janitors of the public schools.

Chapter XVIII treats fully of the need and possibilities of training persons who need special knowledge to help them advance to positions of larger responsibility. For lack of a better name, those employed in the directive and business positions of industrial life have been called "Noncommissioned officers of industry." Doubtless many of these will find in the trade extension courses the tech-

nical information which they need for their present and future positions.

Some, however, need more general and extensive courses. For these the Dunwoody Institute will offer courses, most of them 50 nights long, in such general subjects as shop mathematics, free-hand and mechanical drawing, architectural drawing, industrial design, mechanics, industrial chemistry, and cost estimating for the building trades and for manufacturing. These will be taught with constant application of principles to the different lines represented, and the classes will include persons from all lines of production in the city.

The generous contributions of the Dunwoody trustees to this survey evidence their purpose to discover how the institute can be of greatest service. That they value the survey's efforts to develop a sound basis for the establishment of industrial education is shown by the fact that, without waiting for the report of the survey, they have established day, evening, and dull-season classes and effected trade understandings relating to them.

CONCLUSIONS AND RECOMMENDATIONS OF THE SURVEY COMMITTEE.

The work of the Dunwoody Institute thus far has been largely experimental in character, which has been clearly recognized by the board of trustees and institute officials. It has been struggling to discover the field in which it could be of the most service to the youth of the city and State in the promotion of the industrial and mechanical arts. Meanwhile, it has made a commendable beginning in the establishment of trade courses of the character usually found in such schools, with the exception of the course in automobile repair and construction, which represents a distinct departure from the usual trade-school courses and is, therefore, a distinct contribution. In the first few months of the history of any school, particularly an industrial school struggling to establish itself, many things are done which would be open to criticism in an older or established institution. It would be neither just nor profitable to enumerate them in the case of the Dunwoody Institute, especially in view of the fact that it is making such rapid advancement in the enlargement and improvement of its work.

The present survey is evidence of the purpose of the board of trustees to discover the field in which the institute can be of the greatest service. If the day, evening, and dull-season classes are kept in touch with the best practice of the trades; if the advisory committees will keep the school in close contact with the trades; if the agreements are carried out whereby apprentices are allowed to attend dull-season classes and whereby graduates of the day classes are placed in the industry at an agreed wage, to work one year before

receiving their diplomas, there is every reason to believe that the school will be a large factor in the industrial and educational life of the city.

THE Y. M. C. A. EVENING INDUSTRIAL AND COMMERCIAL CLASSES.

For many years the Y. M. C. A. in Minneapolis has done pioneer work for industrial and commercial education. Much credit, here and elsewhere, is due the organization for providing practical education for its membership and blazing the way by experiments for extending this work on a larger scale by public agencies. Especially to be commended is the way it has cooperated with other agencies. Even its advertising circulars stated that "every person in Minneapolis should be in some form of study this winter," and gave a complete description of evening school work offered by other agencies, listing its own last.

The Y. M. C. A. evening school work included 66 classes giving instruction in 23 subjects, ranging from English for foreigners and penmanship to salesmanship and bookkeeping. Of a total of 1,091 students, 401 received instruction in subjects other than vocational. Thirty classes were conducted for this purpose.

The subjects in the business classes included real estate, salesmanship, character analysis, credit management, personal efficiency, bookkeeping, stenography, business law, business English, and business extension. There were 14 classes with 322 students.

The subjects taught in the 17 industrial classes were builders' drafting, mechanical drafting, electricity, estimating and automobile work. These had 368 students, most of them (207) in 12 classes in automobile work.

The automobile work is done through a private garage known as the Y. M. C. A. Auto School, in which 207, as noted, out of 400 were Y. M. C. A. students.

Most classes are organized into regular courses of two to three years. Usually the class meets twice a week during two terms of 15 weeks each. Usual tuition fees are \$6 to \$15 a term, the largest fee in any case being \$35 and the smallest \$16 for the year. Tuition includes membership in the Y. M. C. A. for the time, and a reduction of \$3 to \$5 is made to persons already members.

The Y. M. C. A. schools are somewhat distinctive in trying to adapt their courses to those enrolled in a way that often approaches individual tutoring. They do considerable pioneering in opening of new courses. With a freer hand than the public institutions, they have rendered much service in stimulating the ambition of young men. The Y. M. C. A. program of symmetrical development for young men through correlated physical, educational, social, and re-

ligious activities gives an even more distinctive stamp to its night school work.

The probability of a new and larger plant for the Y. M. C. A. in the near future promises much for its educational work. The Y. M. C. A. should be encouraged to develop its work, coordinating it with the other public and semipublic institutions of the city and carrying on its own distinctive features.

When the educational department of the Y. M. C. A. was endowed by Mr. W. H. Dunwoody, less than two years ago, the directors of the association unanimously adopted a resolution "to use the Dunwoody fund in educational pioneering through (1) the investigation of the educational needs of young men and boys; (2) experimentation with new educational courses and methods for meeting those needs; and (3) the introduction and development of new educational enterprises." This seems to indicate the true plan and purpose of its vocational education work.

The work of the general extension division of the university includes evening classes of a more technical and advanced character. Attention has been called to the evening classes of the Y. M. C. A. of this character. Economy of effort would seem to require an understanding between these agencies and the public schools, defining at the outset of a widening program the place of each and the co-operation each could give. It would seem that the university extension division should continue to present advanced classes in industry and commerce, leaving the other agencies to provide classes for beginners seeking technical, directive, or business advancement in industry and commerce.

A meeting of the representatives of the public schools, the general extension division of the university, the Dunwoody Institute, and the Y. M. C. A. was held in September, at which the question of their respective fields of service and plans for more helpful cooperation were discussed. It was agreed that at present there was practically no duplication of evening classes in the four institutions, and that there was little danger of overlapping and conflict in the near future. It was agreed that all publicity work concerning evening schools of any one of the four institutions should include some reference to the work done by all the others, so that the people of Minneapolis might be fully informed as to all opportunities for practical training through evening classes.

The necessity of a clear understanding of what work each institution was to do was recognized, but it was felt that such an understanding could not be reached without more experience.

Undoubtedly this meeting will result in better differentiation of the work and closer cooperation in the effort to reach and help all desiring evening school instruction.

PRIVATE COMMERCIAL SCHOOLS.

This study was made under a special committee on commercial education, whose membership is given in Appendix A.

There are 12 private commercial schools in Minneapolis. These differ slightly in purpose and type. Five of the largest work together in harmony, offering parallel courses in bookkeeping, stenography, and general efficiency, charging the same tuition. Three small schools, one emphasizing court reporting, instruct in stenography and typewriting only. Two are connected with sectarian interests and are largely supported by churches. One specializes in expert training and considers that its work begins where others leave off. One is being rebuilt from the ruins of a school which practically failed, and can not, therefore, be judged on the same basis as the others.

The work of the private business schools is, in the main, good, and compares favorably with that in other cities, but these schools differ greatly in merit, as employment agencies and typewriter bureaus testify. A few have little educational value, but others may be recommended. They have filled, until the last eight years when commercial courses were introduced into the public high schools, a very important need in education, and business owes them a great debt, because for so long they alone offered preparation for this vocation.

The aim of all the private schools, as stated by their managers, is to train for wage earning, returning for the tuition money adequate instruction in commercial work and aid in finding places.

The administration of these schools is under presidents or managers responsible only to the pupils; usually the schools are owned by one man or by partners, and there are no stockholders.

The number of pupils varies with the season. The maximum enrollment of day students for all 12 schools was 1,600 during the busiest season. The lowest age for entrance is usually 15. Three schools require 16 years for entrance, and several report no fixed age requirement. The age of graduation ranges from 15 to 18 or 20, depending on the time previously spent in public schools.

The course of study differs with each individual school. Some lay emphasis on stenography and bookkeeping, some on stenography alone. The catalogues show much similarity though they differ in amount of padding and exaggerated statements. The following course seems typical of the larger schools, the smaller ones offering more limited selection of subjects:

Commercial Course or Bookkeeping.

Bookkeeping (double and single entry). Actual business practice, business correspondence, banking, commercial law, business arith-

metic, business penmanship, grammar, spelling, rapid calculation, and business efficiency.

Stenographic Course.

Gregg shorthand, touch typewriting, filing, manifolding, tabulating; letter press and mimeograph copying, actual office dictation, business and legal forms, grammar, punctuation, spelling, penmanship, rapid calculation, correspondence, billing, and business efficiency.

Combined Course.

Bookkeeping, Gregg shorthand, touch typewriting, filing, manifolding, tabulating, letter press and mimeograph, copying, actual office dictation, business and legal forms, grammar, punctuation, spelling, penmanship, rapid calculation, correspondence, billing, and business efficiency.

English Course.

Spelling, arithmetic, penmanship, grammar, correspondence, commercial law, and business efficiency.

Equipment in the smaller schools consists of typewriters of several kinds, and usually a duplicating machine. The larger schools use adding machines. Eight possess mimeographs and three multi-graphs. Two use dictation machines, two billing machines, and one is sole agent for the stenotype dictation machine. Usually, however, where billing is taught, a wide-carriage typewriter is used. The number of typewriters varies from 10 to 52, according to size of the school, and since students of stenography leave typewriting only to practice shorthand, the machines are used almost continuously, giving each a high percentage of efficiency.

Conditions in the private schools are in the main good. In five schools light and ventilation are only fair. Several have no cloakrooms and few have lockers. Improvement of these conditions is highly desirable, especially in the matter of light.

The standard of the work done in the private business school depends primarily upon the amount of general education pupils have had. All the schools express preference for high school students, but none makes this an absolute entrance rule. For young people from country schools, experience and maturity are allowed to count instead of education. Five schools require eighth-grade preparation; four make no positive requirements; two are satisfied with seventh-grade education; one requires "very little general education," and only one insists upon high school work. Those accepting eighth-grade preparation or less, with one exception, offer general English, mathematics, and spelling as a substitute for regular grade school work, but it can not be proved how conscientiously this training is pursued by the student. It is hard to believe that an entire year's

work in the public school can be made up in the business college by devoting an hour or more a day for a few months to general education. A number of graduates of the schools think that English is not emphasized sufficiently. As one young man put it, "to miss one's English class was considered quite unimportant as compared with missing the stenographic or bookkeeping work."

The number of teachers varies from 1 to 10 or 12. No definite standard determines selection of teachers as in the public schools. All private schools, however, say their teachers have had high school education with further training at the university, normal or business schools, and 9 state that "practically all of the teachers have had business experience." The same teachers are used in the night schools.

The method of instruction consists of class work with attention to individual students. Each school states that provision is made for students to progress as fast as they show ability. As soon as a student can advance more speedily than the others in the class, he may pass on to the one just ahead. Since the study of bookkeeping consists of working out assigned lessons in the textbook and ledger, as fast as one portion is completed the student may go on to the next. Theoretically the individual method is good, but its success depends on the number of teachers for the class.

The correlation of subjects in the private commercial school courses which are of an intensive character is good, since the business schools are only vocational in purpose and have little interest in general education except in relation to wage earning.

Practical work consists mainly of practice in dictation, typewriting, mimeographing, keeping books, etc., which their textbooks outline. School correspondence is generally done by the pupils. Some schools relay their students in the school office where their work corresponds to general office work of small business firms. Three schools take in a little typewriting and mimeographing for a small recompense, which offers practice for the students. Three schools have miniature business offices, and the heads of the schools seem to have a good deal of faith in their practical value.

Some business schools announce certain courses which are not actually substantiated. This applies to much of the training on special machines which, in the main, is not thorough. As the dictaphone is taught by using one record on a number of extension telephones, the pupils have no means of stopping or starting the machine for corrections, as they would if using it in an office; therefore the teaching is not practical. It takes four to six weeks to become competent as an operator of a calculating machine. As the schools spend but a little time in instruction on this machine, the pupils learn merely its general principles and not proficiency in operation. Such

courses as advertising, cost accounting, salesmanship, and secretarial work are seldom worked out practically. Most of the private schools do not give the extensive training in office efficiency which they advertise, unless it be in filing.

The amount of time given to practical work in some schools is still too small. The school hours are usually 8.30 a. m. to 12 m. and 1 p. m. to 4 p. m. The pupils in the shorthand and typewriting course spend from 80 minutes to 2 hours in typewriting and twice that time in stenography, the remainder being devoted to business correspondence, rapid calculation, grammar, and spelling. This gives practice work on the machine equivalent to an eight-month course of $21\frac{1}{2}$ working days, as compared with 18 eight-hour days required by the public schools in a nine-month course. Since pupils in private business schools can progress as fast as they like and no definite time is given for graduation, the period spent differs for each pupil. The schools report six to eight months to be necessary for efficient training in stenography or bookkeeping, and nine months to a year for the course combining them. Private business schools, like high schools, allow extra practice time while school is not in session, and state that many individuals take advantage of this privilege.

The contact with business men and the field of office work, as in high schools, comes mainly through their executives. No private business school has an advisory committee, although several have expressed willingness to take up such a suggestion.

The rate of tuition recently adopted for the most prominent schools is a flat payment of \$15 a month. One charges \$25 a month, and several \$60 to \$75 for the course, with the understanding that the student may remain until thoroughly prepared. The aggregate amount of tuition received in all schools is estimated to be about \$150,000 for the entire year.

The problem of dropping out is a matter which private schools can not help except by refusing diplomas to pupils not finishing the work. If a pupil who has paid in advance becomes ill or has to leave town, his money is refunded. Some schools refund money to the pupils who in a given time can not master the subjects. Most pupils are eager to get the worth of their money and stay until proficient enough to get positions. One school reported that only 15 per cent of the pupils enrolled remain to finish; another 50 per cent; six others reporting on this point stated that 75 per cent or more finished the course.

There is no definite standard for determining whether a pupil is ready to be graduated. Many schools require a final test before granting a diploma, but not before recommending pupils for positions. The principal's opinion, based on reports of daily work and

the pupil's desire to earn money, govern the time of his leaving, although many schools test the pupils' ability as they progress. Undoubtedly schools sometimes send out pupils before they are efficient, but this is partly because certain pupils have never had ability or education.

Placement on the part of the private schools is carried on by much the same method as in public schools. Private schools probably receive more calls from employers, and their heads have more time than public school teachers to find places for students and keep in touch with openings. They are mainly indebted to typewriter bureaus for placing graduates. They say that, without receiving any guaranty of positions, the great majority of their students find work upon finishing their training. Six business schools state that the minimum initial salary at which they place their students is \$8 a week, one \$10 a week, and one \$50 a month. Two send girls out at \$6 a week when they can get no more. Temporary work evidently does not come under this rule, for graduates testify that \$6 has been the beginning wage for such work. Many schools take pains to investigate the offices to which they send graduates and share with one another knowledge of employers to be avoided.

Private schools do not follow up their graduates and do not know what becomes of all their students. Not one keeps an adequate record of graduates and beyond knowing, mainly for advertising purposes, the good positions reached by the minority are not aware whether they succeed or fail. Every vocational school should follow up a certain proportion of its graduates to test the value of its instruction. The cooperation of the private schools with the survey in the attempt to do this has indicated their sincere interest in knowing what they have accomplished and what they need to do for greater efficiency.

The amount of solicitation carried on by the private business schools varies. One or two small schools depend upon their reputation and the recommendation of graduates, and do almost no advertising. Almost all the larger schools employ solicitors to obtain students.

The field of activity is now as much in small town and country districts as in Minneapolis, perhaps more so. Evidence seems to indicate that formerly the solicitation among school children here operated to direct pupils away from the high school to the business "college." However, the inquiry made by the survey, June, 1915, among eighth-grade classes showed that only about 18 per cent of the children had been approached in any way by business schools, and a study of the cards signed by eighth-grade children from all schools, giving the school plan for the year 1915-16, showed that 64 had determined to go to private business schools. All these children were interviewed and in no case was their decision a result

of solicitation from the schools they intended to enter. It can not be disputed that high school graduates are a legitimate group for efforts by private schools to obtain pupils.

Some schools solicit through correspondence and mailing of catalogues, letters, and circulars, often containing exaggerated statements concerning the opportunities which result from taking them.

As none of these schools can thrive without a margin of profit the larger the number of pupils the better the school is likely to be. The consequence of the necessity for money making is widespread efforts to induce young people to take up commercial work regardless of their adaptability for such work. The effect upon society is often not beneficial in certain respects.

The schools can not afford to reject many who apply to them, but there is a growing sentiment among the better schools in favor of discouraging immature and poorly educated applicants.

Those in charge of employment bureaus in Minneapolis say that the field of office work is overcrowded and that it is the most inefficient stenographers and bookkeepers who bear the brunt of unemployment. The efforts of private schools to make a living form a large factor in the oversupply. One or two schools so plainly lack the standard necessary for educational work that the community would be much better off without them.

The private commercial school is still serving an educational need and will continue to do so until short intensive courses are offered by the public schools. Certain schools have excellent courses, but the large number of schools results in a lively competition in which the best good of the youth of Minneapolis is a secondary consideration.

Many, if not most, of the private schools are good institutions, the value of whose services are not questioned, but some are not good institutions, because of their low standards of admission, poor equipment, overcrowded classes, superficial and time-worn methods of teaching, and lack of adjustment to the demands of the modern business world.

The situation in regard to commercial education needs careful study by some authoritative body like the Civic and Commerce Association, for the purpose of evaluating the work of private agencies giving commercial training so that the schools which are below par may be eliminated. The data which have been gathered by this study, bearing on specific institutions and not herein published, should prove most illuminating.

It has been stated that these private schools have met a vocational need in Minneapolis for thousands who were unable to take the four-year school course. They are performing a service, how-

ever, which should be offered at public expense. Wider facilities for commercial training are being provided in the public schools and when shorter and more direct business courses are offered in the public secondary schools, most of the private business schools will probably have fulfilled their mission. A healthy competition with the public school on the part of a small number of well-equipped business colleges will then assist in standardizing the work of the former and these colleges will continue to serve the interests of the boys and girls of Minnesota farms, towns, and cities who look to Minneapolis for commercial education.

DENOMINATIONAL SCHOOLS.

This study was made under the auspices of the special committee on commercial education whose membership is given in Appendix A.

Catholic organizations support two commercial schools in Minneapolis, one for boys and one for girls. The girls' school offers a two-year course to which only eighth-grade pupils are eligible. The average graduating age is 17, and the course includes English, bookkeeping, arithmetic, stenography, commercial law, rapid calculations, and office practice. Special short courses are also offered in stenography, English, and office practice.

The school is crowded but the equipment good, and the teachers are thorough, conscientious, and enthusiastic. The instruction, however, is formal and lacking in practicality, and it is a question whether the method of instruction sufficiently develops initiative.

The students are placed through efforts of the priests interested in the school, the alumni association, and the typewriting companies. No follow-up system is observed and no record is kept of reports. About 80 girls are enrolled, and the seniors appear to be mature and businesslike.

The boys' school devotes three years to commercial work. It has a strong alumni association, and through its members and the efforts of instructors the school places its students. The course in the first year consists of Christian doctrine, spelling, English composition and rhetoric, stenography, bookkeeping, history, and etiquette, which means business ethics. Every year the same subjects are studied, commercial law being added in the second and talks on physics in the third year. There are about 200 boys in the school. Sixty-three were graduated in 1914-15, and many of them were at work before commencement. The initial monthly wage at which the school is willing to place students is about \$40.

Some attempt is made to determine whether pupils have chosen their courses wisely. The courses are said to be taught with thoroughness, but the teachers have not had practical experience. The

only contact of the school with the business world is through the alumni association, and it is only through this that the school has any way of following up its graduates.

CORRESPONDENCE SCHOOLS.

The large part which correspondence instruction has played in developing industrial intelligence calls for special consideration. A study of correspondence schools in Minneapolis was made in connection with the survey by the State Department of Labor and Industries, which furnished the facts here given. The sources of information were interviews with students, replies of workmen to schedules, and data furnished by the international correspondence schools.

There are 11 such schools in Minneapolis, as follows: International Correspondence Schools, American School of Correspondence, Patterson Correspondence School, Technical Correspondence School (Chicago), Independent Correspondence School (Seattle), Page-Davis School of Illustrating, International Typographical Union, Federal School of Commercial Designing, Milwaukee Correspondence School, Alexander Hamilton School, and Emerson School of Business Efficiency. As 9 out of every 10 workmen furnishing information had been students of the International Correspondence Schools (I. C. S.), this section is really a study of the work of that company.

Thirty-six thousand students in Minnesota have taken correspondence school instruction with the I. C. S. alone during the last 20 years, and have paid about \$50 each in tuition, according to a statement of that company. While the average price of all courses is about \$75, many pay in installments and fail to finish. On this basis the company has collected \$1,800,000 as tuition from the 36,000 students. About 8,000 were enrolled in Minneapolis and paid about \$400,000 as tuition in the last decade, while 7,000 St. Paul students paid \$350,000 in the same period, a total of \$750,000 for the Twin Cities. Assuming that this company does 90 per cent of the correspondence school work, there is a total of 40,000 Minnesota students paying \$2,000,000 for tuition in the State, of which the Twin Cities contributed almost 17,000 students and \$850,000 in tuition.

According to the I. C. S., 2,301 students were enrolled last year in the Minneapolis district, covering the whole of Minnesota and two or three routes running up into Canada. Of these about 500 were enrolled in Minneapolis and paid about \$25,000 in tuition, while approximately 450 were enrolled in St. Paul and paid \$22,500 in tuition, a total of almost 1,000 students for the Twin Cities paying almost \$50,000 for instruction by correspondence.

The purpose of the International Correspondence Schools, as stated in their catalogue, is threefold: first, "teaching employed persons in science of their trade or profession; second, preparing mis-

placed or dissatisfied persons for more congenial or better paid work; third, giving young unemployed persons the training necessary to enable them to start at good salaries in chosen vocations."

Owing to the limitations of instruction by mail, the first of these purposes constitutes their greatest field of usefulness. Only in one or two cases was a man found who had finished a course which did not apply directly to his trade or was not closely related to the work he was doing. These exceptions were men with mental ability above the average.

The second purpose applies when a man wants to take up some other branch of the business at which he is employed; as, for instance, when a man employed in a woodworking shop takes up an architectural course or drafting course. The main benefit of the course is in giving the theories and principles involved in the trades. The application depends entirely upon the students. Many who say they have been benefited will not give the course full credit for their advance. They assert much in every case is due to personal ambition.

A STUDY OF CORRESPONDENCE SCHOOL STUDENTS.

The Minnesota Department of Labor made a study of 154 men employed as productive workers in Minneapolis who had taken or were taking instruction by correspondence. Of these 135 had been or were students of the International Correspondence Schools. Thirty-four different courses were taken, of which five—mechanical engineering, drafting, electrical engineering, electric lighting and shop practice—were pursued by 80 per cent, while the rest took 30 different courses, four being the largest number enrolled by any one course.

Forty-four per cent reported they had been benefited in increasing either their efficiency or their earning capacity, while 56 per cent said they had received no help from the courses. Of the 154 interviewed, 47 per cent had dropped out, 23 per cent had finished, and 30 per cent were still working in courses.

Not all took the courses because they desired better positions or greater efficiency. Many enrolled because of the insistence of salesmen who talked them into signing a contract which they did not understand. In two cases men bought courses thinking they were to have personal instruction.

Whenever he had profited by the course, the student was enthusiastic in his praise and support of the school. The dissatisfied student was equally emphatic in his attitude. Sixteen different reasons for failure to succeed were given by dissatisfied students, as follows:

1. "Did not have any idea of the amount of work that the course would take until I got started."
2. "Too much elementary stuff."

3. "Too tired when day's work was done."
4. "Nightwork."
5. "Wanted to do something else in the evening besides study."
6. "Lack of ambition."
7. "In order to handle my work I had to study ahead of my course."
8. "Taken sick."
9. "Got what information I wanted so I dropped the course."
10. "Got married."
11. "Lack of previous education."
12. "Too much stuff that did not apply to my business."
13. "Was not getting anything that I did not already know."
14. "After I had finished paying for the course the school paid no more attention to me."
15. "Did not understand the English language."
16. "Agent got me to take course when I did not really want it."

Perhaps the most important cause for not succeeding is that the student became tired of the delay in getting answers to his requests for information. While most instruction by correspondence is more direct and less general than that of most schools, a long period is required to complete even a short course by mail, the average time being two years and seven months. When a student writes to the school for help there is a delay of a week or more before he gets a reply, and when this happens often he naturally loses interest and drops the work.

The schools attempt to meet this trouble by having local men and graduates of similar courses to assist students. Organized classes for study of correspondence courses have not succeeded and no students were found who had ever attended such classes. The central office of the International Correspondence Schools at Scranton, Pa., has established a follow-up system "to prevent lapse, to aid struggling students, to stimulate discouraged students, and to increase the amount of work done by all students."

A common-school education is necessary to succeed in correspondence work. Preliminary education determines to a great extent the success or failure with correspondence courses. The correspondence schools require only a knowledge of how to read and write English. In some cases, however, salesmen have sold courses to foreigners who could scarcely talk simple English. In no case interviewed had a course been completed where the preliminary education was below the eighth grade or its equivalent.

The previous education of the students varied widely. Of the 154 interviewed 110 gave information as to what schooling they had had before undertaking correspondence courses. Twenty-one per cent had had less than an eighth-grade education, 79 per cent eighth grade or more, 35 per cent high school or its equivalent, 3 per cent part of a university course, none a full university training, and 31 per cent night-school work.

The home office of the I. C. S. stated that the majority of their students probably had less than an eighth-grade education; that one of the chief aims of the school was to help "those who could read and write English, but could do little more"; and that the company know of "many cases in which students with less than an eighth-grade education have completed or made sufficient progress with their studies to achieve real success in their line of work."

In every case where the student had taken night school courses in the public schools or Y. M. C. A. he had reported that he had been benefited by the course. This, however, did not hold true with correspondence school instruction.

The attitude of the employers was either in favor of the correspondence school or indifferent to it. A few have tried to influence students to take courses by giving them free scholarships. Some railroads are making deductions from their pay roll in favor of the correspondence schools. Others refuse to encourage the courses, holding that the schools raise the hopes of the men for high-salaried positions without giving an adequate idea of the time or effort necessary to prepare for such positions.

Whether or not a student can succeed with a correspondence course depends largely upon his personal ambition. The books and instruction are up to date and thorough in fundamental principles. It is doubtful whether any other set of textbooks are as good for the student desiring direct and practical instruction as those of the I. C. S. in some lines. If the student has sufficient determination and mental ability he will succeed.

CONCLUSIONS OF THE SURVEY COMMITTEE.

(1) The correspondence schools have done much for the ambitious man of superior preparation and ability.

(2) Instruction by mail can never take the place of the living teacher in a classroom.

(3) Large sums of money are annually spent by students for tuition for instruction along many different vocational lines and for general education.

(4) It is as much the duty of the public schools to provide this instruction through part-time and evening classes as it is to operate high schools for more fortunate boys and girls fitting for business and professional careers.

(5) The large number of students reached by the correspondence schools makes them institutions not only of public but of national importance; and the large amount of money spent by wageworkers, many of whom can ill afford to pay for the instruction which they give, will draw public attention to, if not finally public regulation of, their methods and standards.

A CHART OF VOCATIONAL EDUCATION IN MINNEAPOLIS.

The accompanying chart relates to public schools and colleges, semipublic schools, corporation schools, and private schools. The work of the public schools shown in the preceding chapter is here included so that a view of all facilities in Minneapolis for vocational education may be presented. Under "semipublic schools" are included those not controlled by the public, but operated for the public good and not for profit. Schools operated by commercial establishments for their own employees are classed as corporation schools.

While manual training, domestic science, and domestic art classes are listed among the public school vocational facilities, much of this work is no more than prevocational. While it has been impossible to separate residents from nonresidents, most of the figures, except for business colleges, represent Minneapolis schools only.

An inspection of this chart shows in all the courses specified about 16,297 students, of whom 9,207 were enrolled in the public schools and the extension classes of the university, leaving about 7,790 in the semipublic and private schools. Omitting Dunwoody Institute, the corporation schools, and the Bankers' Institute, where no tuition is charged, about 6,000 fees were paid, a total of about \$336,000 for tuition last year.

The detailed information in the chart was gathered before September 1, 1915, and includes only schools and classes in operation 1914-15 or planned for 1915-16 previous to September 1, when the field work of the survey closed. Consequently a number of classes established since that date do not appear.

CONCLUSIONS OF THE SURVEY COMMITTEE.

In a widening program of vocational education for Minneapolis many of the courses now offered by private institutions, particularly those charging tuition, will eventually be assumed by the public schools and be given free. There is no more reason why students should be obliged to pay for vocational preparation in one legitimate and desirable line than in another, or for one grade rather than another. The question before the public schools is partly one of resources and partly one of wise choice of the kinds of vocational education now offered at private expense which they shall take over. It is probable that there will be an increasing number of corporation schools training workers to meet their special needs. The semipublic school not operated for profit is here carefully differentiated from the private school. The semipublic school will continue as long as it serves the public good. The private school operated for profit is only a phase of development which will lead to large free public educational opportunities.

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It may be doubted whether the tuition-charging school, semi-public, or a private school operated for profit will be entirely eliminated by the expansion of free public facilities. There is sufficient evidence to show the existence of a class of ambitious individuals who prefer to pay fees and who do better work under the fee system. These schools will survive or disappear according to their individual merits, and according to their ability to keep pace or to outrun, from time to time, the public institutions.

CHAPTER V.

TO WHAT EXTENT IS APPRENTICESHIP MEETING THE NEED?

CONDITION OF APPRENTICESHIP IN MINNEAPOLIS.

The main facts regarding apprenticeship have been given in the separate chapters of this report devoted to each trade. This chapter attempts to interpret and analyze apprenticeship as an institution for training new workers.

According to former practice, an apprentice is a worker receiving initiatory training under a legal contract entered into by the employer, the apprentice and his parent. Originally this written indenture provided that, in place of the parent, the master or employer was to have care and custody of the youth during his apprenticeship, and at the same time was to teach him "the art and mystery of the craft." The apprentice in turn agreed to obey the master and to exchange his services for support and instruction in the trade.

No apprenticeship of this kind exists in any of the trades and industries of Minneapolis. Instead a wide variety of schemes called apprenticeship and so designated by the United States Census of Population are now relied upon to prepare workers for the trade.

There are five such methods of regulating apprenticeship in Minneapolis: (1) By written contract; (2) by trade agreement; (3) by custom; (4) by a helper system; (5) by schooling. Sometimes the helper system is regulated by trade agreements and sometimes by custom. With the use of public and private schools to prepare youths for wage-earning occupations there has come a fifth and growing plan, here called apprenticeship by schooling.

Apprenticeship by written contract is infrequent in Minneapolis, and so far as the survey has been able to ascertain is used in only three trades, photo-engraving, bricklaying, and painting. The provisions of the written contract used in each of these strongly organized trades embody in part the union regulations for apprenticeship.

In these contracts the employer agrees to instruct the youth, but is not given the care and custody of him. While the old-time apprentice exchanged his services for instruction and support, the youth agrees in these written contracts to exchange his services for instruction and wages, which in the case of bricklayers and photo-engravers are specified in the contract.

The written contract in the painter's trade is little more than an application approved by the employer, and in none of the three trades does the contract cover all the union rules and regulations. The parent is not a party to the agreement, and the contracts between the employer and the minor have little legal significance.

Apprenticeship by trade agreement occurs when the owner of a "union" shop agrees, in employing new workers and teaching them the trade, to observe the rules and regulations of the union for the trade, which in this way become the terms of apprenticeship.

There are two kinds of apprenticeship by trade agreement in Minneapolis. In the first, the conditions are set forth in the written agreement between the employer and the union. Apprenticeship is carried on in this way in the case of machinists, compositors on some newspapers, photo-engravers, boiler makers in railroad shops, electro-type workers, brewery workers, and electrical workers.

In the second, the arrangements with the employer for training the apprentice are not prescribed in a written agreement, but are governed by the rules and regulations concerning apprenticeship in the national constitution and by-laws of the union. Sometimes the understanding with the shop to adhere to the union regulations is not written but oral or tacit. Apprenticeship of this kind exists to some extent among electrical workers, stonecutters, plumbers, carpenters, cabinetmakers, compositors in job shops, pressmen, sheet-metal workers, steam fitters, lathers, pattern makers, bakers, cigar makers, barbers, and bookbinders.

In general, the union by-laws or the trade agreement specify minimum and maximum age of entrance upon apprenticeship; number of apprentices allotted to shops of different size; obligations which the employer assumes in training the apprentice; years of service required in apprenticeship preliminary to journeymanship; usually the wage to be paid the apprentice during the successive years of his service, and the length of time he is to be employed each year.

Apprenticeship by custom usually obtains in an "open shop" or in unorganized trades, where, without any indenture or agreement, young persons are taken on at a learner's wage and advanced to journeymanship either in orderly sequence or as rapidly as employers consider them competent.

An illustration is furnished by the milliner's trade. Without any papers being signed, new girls serve as learners the first year for little more than their car fare and the second year receive \$3 to \$4 a week. After this, their wages are advanced as they show skill. This plan for girls known as apprentices in millinery has become a well-recognized custom in practically all the shops employing learners.

Frequently where apprenticeship by custom exists, new workers are taken on without even a verbal understanding as to years of service, wages, or kind of work. In some instances, apprenticeship by custom exists in unorganized shops of trades having a labor organization whose employers engage apprentices on substantially the same conditions as in union shops except that in the latter the number to be employed is limited.

Apprenticeship by custom exists, with one or two exceptions, in all the skilled trades named in the foregoing paragraphs. Where the trade is strongly organized, practically no apprenticeship by custom occurs, but where not strongly organized or not organized at all, some apprentices by custom will be found. For example, there is no apprenticeship by custom in electrotyping, which is 100 per cent organized. Practically all apprenticeship in the carpenter's trade is by custom, as all carpenter shops in the city are open shops. In the machine shops of railroads where the unions have agreements apprenticeship is entirely by trade agreements, but in all other machine shops of Minneapolis it is entirely by custom.

Apprenticeship by the helper system is found in trades where the work is too arduous for youths and where there is little opportunity for shop training, the helper acquiring the tricks of the trade in assisting his principal. This plan is used in blacksmithing, boiler making, steam fitting, and plumbing. Perhaps the best illustration is the boiler shop of the railroads, where a new worker, who must be over 21 years old, starts as a second-class handy man. From this position he may rise by successive steps through 13 classes of boiler makers to that of a first-class boiler maker.

Apprenticeship by schooling obtains when a school is established which gives a student the preparation needed before he enters the occupation as a wageworker. This kind of apprenticeship is not given in the United States Census of Occupations because such learners are not usually called apprentices. It is included here, however, because the school is already being used in Minneapolis to give new workers some preparation for a variety of occupations, and because the failure of other kinds of apprenticeship seems to point to the school as a growing means of solving the problem.

Attention is called to the chart and the text comment upon it in Chapter IV, showing the wide variety of vocational schools already established in Minneapolis. The rapid rise of these institutions, unsatisfactory as some of them are, shows not only that in some occupations apprenticeship no longer serves as an adequate means of preparing competent workers, but also that the school has become a definite substitute.

This is especially true of the commercial school, which has developed simultaneously with the modern office. The commercial

world has long ceased to give systematic training to its employees and relies entirely for this upon the public and private schools.

Of more immediate concern here are schools that give instruction in trade and industrial subjects. The chart in Chapter IV lists both day and evening classes in these subjects. For the purpose of this chapter the evening classes are disregarded. In the opinion of employers and employees evening school work serves best when it gives supplementary instruction to persons with experience in a trade or occupation. Evening courses which attempt to train novices, particularly in practical work, are too rudimentary and too limited as to the time to afford any adequate substitute for apprenticeship training. Consequently, only day trade and industrial classes are considered.

Up to September 1, when the field work of the survey closed, only two companies were conducting schools for employees. One telephone company had a brief course for novices in switchboard operating and one department store a short course in salesmanship. Since then the other telephone company has established classes in the operation of the automatic telephone, while several department stores have introduced lectures in salesmanship.

In all, 14 private schools, operated for profit, give day-class instruction in telegraphy, operation of traction engines, window dressing, barbering, manicuring and hairdressing, automobile repair, sewing, and dressmaking.

The number of students in these schools is shown in the chart. Some do good work and prepare large numbers of persons for certain occupations. The survey was unable to obtain definite information as to the number going from the schools into the trades or as to their success as workers. Comment on these schools has already been made in Chapter IV. The time given by the student for preparation in most cases does not seem to promise much apprenticeship training, the average in all the courses, except telegraphy, being about six weeks. These schools occupy a very limited field and do not cover any highly skilled trades. Even if they gave adequate preparation, the tuition they charge for very brief courses is so high as to place them beyond the reach of most.

Later this chapter will discuss the effort by the Girls' Vocational High School to give girls a two years' practical and technical training and place them as advanced apprentices in dressmaking, millinery, garment making, salesmanship, and junior nursing; also the effort of the Dunwoody Institute to train boys in a two years' course and place them as advanced apprentices in electrical working, telephony, carpentry, cabinetmaking, machine-shop work, and automobile repairing and construction.

The number of apprentices in the manufacturing and mechanical industries of Minneapolis in 1910 was 634, according to the United

States Census, of whom 554 were males and 80 females. Since the census must rely for its classification upon statements of workers, this number represents a rather rough return as to number of apprentices and includes persons from each group of apprentices considered; it is also doubtful whether all helpers are included. Of the male apprentices, 142 were employed in building and hand trades and 412 in manufacturing industries. Of the 80 females, 67 were employed in millinery and 13 in dressmaking.

It is impossible to make an accurate estimate of the number of apprentices in the manufacturing industries for comparison with the census figures, because the term apprentice is very uncertain in its meaning and scope.

According to the survey figures from the joint conferences of employers and employees, checked up by the registration of the unions, there were 441 apprentices in the building trades in Minneapolis, distributed as follows:

Electric workers.....	50
Plumbers	82
Carpenters	50
Painters	25
Bricklayers	30
Plasterers	25
Steam fitters..... ¹	145
Cabinetmakers	20
Lathers.....	4
Sheet-metal workers.....	10

These figures seem to indicate that the census returns of 1910 were too low or that the number of apprentices had increased since then. Assuming that as many apprentices are in the manufacturing industries now as in 1909 (425), and in dressmaking and millinery (80), and adding the number in the building trades in 1915, there would be approximately 946 in Minneapolis. At best, these figures are only a rough estimate and do not include a small group of apprentices in hand trades not counted among the building trades.

Even if it were assumed that all these 946 apprentices were getting adequate training, they represent a very small contribution to future workmanship when it is pointed out that productive work in Minneapolis in 1909 employed 53,250 persons.

Conditions of work and of apprenticeship in Minneapolis are about the same as in every other large city in the country, indicating that apprenticeship, if not actually on the decline, furnishes little hope for adequate training even in the skilled trades. About two-thirds of the 53,250 productive workers in Minneapolis reported by the census are in unskilled or low-grade skilled industries, where

¹ These are not real apprentices, but helpers, though sometimes called apprentices by the trade, and hence included here.

there is no apprenticeship and the conditions of manufacturing are such that there probably never will be.

These industries employ many workers and manufacture such products as flour, lumber, textiles, chemicals, and clothing on a large scale, using highly specialized machines which operate almost automatically and require workers only to feed them.

In general, what little apprenticeship there is in Minneapolis is in the building, printing, tobacco, brewing, dressmaking, and millinery trades, and the machine shops, about one-half of all being in the building trades.

Even in these trades in which apprenticeship is the principal avenue of entrance, large-scale production, specialization, and introduction of machinery have worked great changes. What was formerly a trade has become machine work. The old-time tradesman has become a machine worker no longer able to learn the whole trade nor use it in industries that have increased the demand for a kind of unskilled labor which untrained youth and man can learn quickly.

This may appear to be rather a gloomy picture, both as to opportunities for apprenticeship training and as to the need and opportunity for the well-trained and all-round workman. On the other hand, employers and employees agree that, while the number of competent all-round workmen is comparatively less than ever, the need for a few such men is more intensive. One evidence of this is the eagerness with which employers agreed to employ the graduates of the two-year courses, fitting for different trades, offered by the Dunwoody Institute.

In the conferences last summer, employers and employees in practically every trade agreed that some form of apprenticeship training was greatly needed for the worker and the business, for one or all of the following reasons:

(1) A more careful selection of men who want to follow the trade results.

(2) The apprentice advances into journeymanship with more interest in his calling.

(3) The best time to get full knowledge of different machines and processes is while the learner is young. With proper apprenticeship training the youth learns best methods at the outset, instead of unlearning bad practices later.

(4) Where school training accompanies shop practice, the youth gains technical mastery over processes which would otherwise be mechanical, and learns to adapt himself to changing conditions as the untrained specialized machine worker never can.

(5) Wider knowledge of all processes gives him an understanding, even in specialized work, which machine hands can not have.

(6) Apprentices of the future, if some better method of teaching can be found, will be not only all-round men, able to cope with every situation, but also men from whom the shop can obtain foremen and technicians.

"Modern industry may even complete an organization in which all the work is done by machinery made almost automatic and operated by machine hands, but will always have a need of the men who are masters of its processes to bind them all together and to direct the labor of the machine worker."

Rules and regulations for apprenticeship as to age, wage, period of service and quota limitations vary greatly not only between different trades but between organized and unorganized shops. In the accompanying table the rules and policies adopted by the union are given where there is an organization of any kind, strong or weak. Where there is no organization, the prevailing custom of the trade is given.

TABLE 9.—RULES AND REGULATIONS FOR APPRENTICESHIP IN MINNEAPOLIS.

Trade.	Age.	Wage.	Period of service.	Limitations as to quota.
Barbers.....	Not under 16.	No regulation.....	Not specified.....	1 to shop.
Blacksmiths.....	No requirement.	Helper, big fires, 27½ cents an hour; helper, 2d fires, 27½ cents an hour; helper, spring makers, 25½ cents an hour; helper, general, 24½ cents an hour.	2 years as helper; 3 years as advanced helper.	1 advanced helper to every 5 blacksmiths; 1 to shop.
Brewers.....	18 to 21..	1st year, \$14.50 a week; 2d year, \$16.50 a week.	2 years.....	1 to the brewery. If 20 men are employed, 2 but no more.
Bricklayers.....	16 to 20..	1st year, 20 cents an hour; 2d year, 30 cents an hour; 3d year, 40 cents an hour.	3 years.....	1 to each contractor.
Cabinetmakers.....	18 to 22..	1st year, \$2.25 a day; 2d year, \$2.50 a day; 3d year, \$2.75 a day; 4th year, \$3.15 a day.	4 years.....	1 to 10 journeymen.
Carpenters.....	17 to 22..	1st year, \$1 a day; 2d year, \$1.50 a day; 3d year, \$2.25 a day.	3 years.....	Do.
Cigar makers.....	16 to 17..	No regulation.....	do.....	1 to shop up to 5 journeymen; 2 for from 5 to 10 journeymen; 3 to 10 or more.
Compositors.....	No regulation.	No union provision; 1st year, \$6 or \$7 a week; 2d year, \$8 a week; 3d year, \$12 a week; 4th year, \$15 a week.	4 years.....	1 to 5 journeymen.
Dressmakers (no organization or agreement).	do.....	Very low.....	No provision.....	
Electrical workers.....	18.....	1st year by contract; 2d year, \$2.50 a day; 3d year, \$3 a day; 4th year, \$3.50 a day.	4 years.....	1 to 2 journeymen.
Electrotypers.....	No provision.	1st year, \$17 a week; no provision other years.	5 years.....	1 for 1 to 3 journeymen; 1 to each additional journeyman.
Horseshoers.....		No provision.....	4 years.....	1 to shop.
Lathers.....	18 to 21..	\$1.25 to \$3 a day, depending on lath laid.	1 to 2 years; when he becomes third-class lather.	

TABLE 9.—RULES AND REGULATIONS FOR APPRENTICESHIP IN MINNEAPOLIS—Con.

Trade.	Age.	Wage.	Period of service.	Limitations as to quota.
Machinists.....	16 to 21..	1st year, 12 cents an hour; 2d year, 16 cents an hour; 3d year, 20 cents an hour; 4th year, 24 cents an hour.	4 years.....	1 to 5 journeymen.
Millinery (no organization or agreement).	No regulation.	1st year, \$1.50 to \$3 a week; 2d year, \$2.50 to \$5 a week.	2 years.....	
Painters.....	16 to 21..	1st year, \$7 a week; 2d year, \$12 a week; 3d year, \$15 a week.	3 years.....	1 to 3 journeymen; 2 to average of 15; 1 to every 25 men thereafter.
Photo-engravers.....	16.....	1st year, \$5 a week; 2d year, \$7 a week; 3d year, \$9 a week; 4th year, \$12 a week; 5th year, \$15 a week.	5 years.....	1 to 4 journeymen; 2 to 7 journeymen.
Plasterers.....	16 to 21..	1st 6 months, \$1 a day; 2d 6 months, \$1.50 a day; 3d year, \$2 a day; 3d year, \$3 a day; 4th year, \$4 a day.	4 years.....	1 to each contractor.
Plumbers.....	17.....	No union provision; \$5 a week to \$2 a day.	No specified period; becomes junior plumber upon passing city examinations.	1 to each shop.
Sheet-metal workers..	About 16	30 cents an hour.....	3 years as helper; 1 year as apprentice.	1 to 5 journeymen; 1 helper to each man on job.
Steam fitters (no apprentices; helpers only in Minneapolis).	21 years for helpers.	\$2.50 a day.....	5 years.....	Up to 4½-inch pipe, 1 helper to 1 journeyman; over 4½-inch, 1 helper and 1 laborer to 1 journeyman.
Stonecutters.....	Not over 18.	1st year, \$1 a day; 2d year, \$1.50 a day; 3d year, \$2 a day; 4th year, \$3 a day.	4 years.....	1 to 12 journeymen.

In no other question investigated by the survey was such free expression of opinion gained as concerning apprenticeship. A conference committee for practically each skilled trade, composed of two employers and two workers, gave frank consideration to the problem and agreed in most respects both as to the present condition of apprenticeship and the causes of its decline. These views were supported by practically every employer and employee with whom the question was discussed. A summary of these conferences with quotations of representative statements from the trades follows:

The matter in the foregoing table was not the subject of much discussion. While in times past such questions as age, wage, period of service, and limitation on the number would have provoked vigorous discussion, none, except limitation of numbers, was given more than brief consideration. Most of the conference centered around the present unsatisfactory arrangements for training apprentices and ways for improvement.

The limitation upon the number of apprentices allotted to a shop under union rules brought out, in frank discussions, sharp difference of opinion between employers and the unions. While few employers

even in union shops have the full quota of apprentices allowed under union regulations, a large majority declared they were opposed to the limitation as a matter of principle. Their position may be stated thus: "As employers in shops independent of the unions we are not interested in the limitation imposed by the unions on the number of apprentices, but we have always been against it." Most employers declare the limitation showed that the union favored apprenticeship "not so much as a device for training new workers but as a means of restricting the number of journeymen in the trade and of insuring new workers favorable to the union."

The union representatives admitted that the main purpose in limiting the apprentices was "to prevent the overcrowding of the trades with its resulting reduction of wage," stating that "It is right in principle for those dependent on a trade for a livelihood to protect themselves against undue competition and to organize themselves for the protection of mutual interests," and that "while this is true, we have always favored the proper training of the apprentice in the shop and many of the unions have tried through their by-laws and trade agreements to insure this to the boy."

The fact that most of the shops do not have the full quota shows that limitation of apprentices is not an issue at present.

The facts and opinions gathered from these conferences are unsatisfactory and discouraging to those who have believed in the old form of apprenticeship. Except for three important railroad shops and a few employers employing one or two apprentices, practically no employer, whether operating under or independent of union rules, has the quota of apprentices allowed under such rules. Because their work consists of a variety of repairs affording good opportunity to use and instruct apprentices, the three railroad shops have found the employment of apprentices to be profitable both for immediate returns and for obtaining good workmen.

Most employers do not want apprentices under the old system. Perhaps the most striking fact brought out by the survey was that most employers do not want to be bothered with apprentices. Some of the reasons given were:

Apprentices of the old kind are unprofitable as a business proposition.

Modern industry is organized to produce goods, not to train new workers.

In his first year the apprentice, as a novice, is a liability rather than an asset.

The wage of the modern apprentice is too high; he exchanges his labor for wages greater than his work.

The employer can not afford to pay the wage and in addition go to the trouble and expense of giving instruction.

The wage paid is so high as to make it impossible for the employer to employ apprentices, and if he does it is necessary to use them for productive work rather than as learners.

The cost of systematizing and supervising the work of the learner makes the task unprofitable from the standpoint of either immediate or future returns.

It is not safe in some lines to employ the apprentice as a young learner because of the danger from machines and the value of the materials handled.

In the seasonal building trades most employers objected to giving continuous employment to apprentices, declaring that, aside from the cost, they disliked to assume responsibility for training young workers.

To the facts brought out by employers the unions, as a whole, did not take exception. They deplored the specialization in modern industry which is making apprenticeship of the old kind increasingly difficult. While they conceded that in some trades, at least, such apprentices are undoubtedly unprofitable to the employer, "nevertheless, the employer usually makes back the loss before the close of the period of apprenticeship." Some unions admitted that the wage of the apprentice, particularly for the first and often for the second year, was too high, but declared it necessary in order to attract desirable boys.

Most of the unions, though recognizing the difficulties, thought it possible to go much further than the employer seemed willing to go in systematizing shop experiences of the apprentice, and that a proper system of helper training "not only would do away with the most of the present fear as to injury to the apprentice and damage to goods, but also would provide a better trade education than is now being given."

"Only," it was said, "in proportion to the employer's sense of obligation to prepare new workers, even if it is necessary for him to go to some expense and trouble, can the shop succeed as a device for instructing the apprentice."

Employers maintain that apprenticeship does not develop desirable boys. Some prefer "American boys," saying, however, that "the American boy is not willing to serve faithfully in the trade." Many say they are constantly besieged by apprentices who want to remain at one machine or process where the wage is better than in regular apprenticeship.

They say: "Young men don't want to learn the whole trade, but just enough to get by." "Many apprentices never finish the training if such it may be called." "They leave for more money at special jobs in other shops." "They drift away to other shops and cities carrying with them the asset of experience and skill which they have gained with one employer to use it for the benefit of a competitor." "Even when they serve until journeymanship they are quick to shift to other shops before the employer who has apprenticed them is able to profit by his investment in them."

The unions admit the increasing difficulty of getting promising apprentices, but assert that this is due in part to the fact that many trades have ceased to train apprentices properly. "If the apprentice is not engaged or instructed in anything but a monotonous drudgery he sees nothing ahead of him in the trade." "If he learns only a few specialized processes he does not see why he should remain three or four years as an apprentice learning only to be a machine hand."

Unions as well as employers recognize the temptation of the apprentice "to shunt off into a special task as a machine worker," but also feel that "there is too much of a tendency on the part of some employers to take advantage of this attitude of the apprentice by assigning him to one task permanently."

The unions admit that apprentices quit before their time is out and sometimes go elsewhere as journeymen. "Admittedly the matter is difficult to control." "Where the trade is strongly organized the union often succeeds in compelling the apprentice to return and complete his apprenticeship." "If the shop career of the apprentice was properly organized and systematized the present difficulty in getting and holding good boys would largely disappear."

The attitude of the apprentice himself has had, in the opinion of both employers and unions, a great deal to do with the decline of the old apprenticeship. The following quotations are representative:

"Like the employer, the American boy, and to an increasing degree the foreign-born boy, object to being bound by rules and regulations as to wage, period of service, and kind of employment and training." "In many instances he looks upon apprenticeship as a form of wage slavery." "Unlike the apprentice of European countries, he is not willing to make thoroughgoing preparation for the future, but wants the largest immediate return for his labor." "It is the spirit of the age which has had most to do with the failure of apprenticeship in getting and keeping promising boys."

"In a few of the trades, at least, the beginning wage of the apprentice is less than he could earn in a short while in some juvenile employment or factorized process. Even when the wage at the start is as good or better than the apprentice could make in other lines, the gradual rise of wage from year to year during his period of service does not appeal to him as offering the same opportunity for quick return as other lines outside the skilled trades."

"In his eagerness he forgets that if he would forego wage earning, journeymanship at the end would offer better wages and larger opportunity for advancement than can possibly come to him in highly specialized occupations where the entrance wage is good but

where the top wage is soon reached." "The shifting of apprentices to other positions is due to a desire for a larger wage, and, if the employer does not grant the request for the change of work, the apprentice will shift to another shop where it will be granted." "In the shops where the work under modern production is highly specialized in all departments and the piece-rate system of wage is used, there is undoubtedly a strong temptation for the boy to remain at some one machine or process rather than to shift to another machine and begin again at a lower wage."

"Undoubtedly the failure under the modern system of production to systematize and standardize the shop experience and training of the apprentice, as well as the almost total absence of technical instruction, is a moving cause of the failure of so many apprentices to finish the required period of service." "Much of the work they perform is menial, automatic, monotonous, meaningless, and uninteresting. Some of this is probably good and unavoidable, but too much of it leads apprentices to feel that it is of no consequence and leads nowhere." "Discouraged because they are not gaining any insight or skill in trade processes, they seek a change of employment, a new start, and a larger income."

The apprentice of to-day must rely for instruction upon the foreman and journeyman. Unless they have a direct interest in the apprentice, he is frequently neglected. The testimony of apprentices themselves and of employers and journeymen indicates that often the indifference and unwillingness of the journeyman to teach the trade to apprentices have helped to discourage and eliminate them.

The lack of proper shop training of the apprentice was admitted by both employers and employees for practically all the trades except that of machinist in the railroad shops, where the apprentice is trained under the specific agreement between the railroad companies and the machinists' union.

Under the terms of this agreement apprentices "will be instructed in all branches of the trade during their term of apprenticeship and as far as practicable will not be required to work over four months on any one machine or class of work." These shops have charted the work for each of the four years.

In addition to charting the work these shops keep records showing what the apprentice does each year and his progress. Following is the card checking system devised by the superintendent of motive power of the "Soo" Railroad. It represents the highest development of systematic training of apprentices that the survey has found in this city:

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE RY. CO.			
RECORD OF.....		MACHINIST APPRENTICE.	
Entered service 6-9-11. Age, 18.			
	TRAINING.	ABILITY.	CONDUCT.
FIRST YEAR.	Drill press..... 6-9-11 to 7-1-11. Shaper..... 7-1-11 to 10-2-11. Boring mill..... 10-2-11 to 1-2-12. Slotter..... 1-2-12 to 4-2-12.	Fair. Good. Fair. Fair.	Good. Inclined to be inattentive. Good. Good.
SECOND YEAR.	Lathe work divided between 4 engine and turret lathes... { 4-2-12 to 7-2-12. 7-2-12 to 10-2-12. 10-2-12 to 1-2-13. 1-2-13 to 4-2-13.	Good. Good. Good. Good.	Good. Good. Good. Good. } A little slow in movement and conception.
THIRD YEAR.	Valves..... 4-2-13 to 7-2-13. Eccentrics..... 10-2-13 to 1-2-14. Planer..... 1-2-14 to 4-2-14. Rods..... 4-2-14 to 7-2-14.	Good. Good. Good. Good.	Good. Good. Good. Good.
FOURTH YEAR.	Devoted to floor work, including air brake and truck work..... { 7-2-14. 6-9-15.	Good. Good.	Good. Getting better. Good. O. K.
REMARKS: Will make a good mechanic.			

In general, the experience and the attention the apprentice gets in the different trades of Minneapolis depend upon the employer and the nature of his business. Employers vary greatly in their attitude toward apprenticeship and the apprentice. Some feel a keener sense of responsibility for him than others. Some make an effort, unsatisfactory to themselves, to give him as wide an experience as the shop will permit. Others state frankly that they dislike to be bothered with apprentices and permit them to receive training through chance experiences of the trade. The experience of the apprentice differs widely in different plants. In general, the more highly specialized the business the more difficult it is to broaden the work of the apprentice and give him an all-round training.

Regulations as to training of apprentices have been adopted by the unions in most of the trades of the city. Plumbers, steam fitters, lathers, cabinetmakers, and cigar makers have no provisions.

As already stated, the machinists provide for shifting apprentices from machine to machine once every four months. The stonecutters provide that "the apprentice shall be given the best work as far as he is able to do it and pushed along as fast as his ability will allow." In the case of electrical workers, the apprentice "must, before being admitted as a journeyman, pass an examination before the regular examining board of this local union." The employing painter who has an understanding with the union agrees "to use all proper endeavor to instruct the apprentice to learn said trade."

Written contracts of apprenticeship made by the bricklayers' union provide that the boy is to be taught the trade. The sheet-metal workers state that "helpers who look promising are asked to join the union." The brewers' organization provides that "all apprentices must be given the opportunity to work in all departments of the brewery."

With the exception of the machinists' union, the blacksmiths' union has the most specific regulations of apprentice training in its by-laws. They read: "A helper shall be permitted to have a fire after he has worked three years continuously in the shop that he is employed in. He shall not be required to work on one class of work for a longer period than six months, if at all possible, and during the period of his advancement he shall be instructed in all branches of the trade, after which he shall receive from the company a certificate." No apprentice in the blacksmith's trade was reported.

The Minneapolis Typographical Union requires all apprentices who are to be compositors to take a course of instruction in the correspondence school at Chicago, maintained by the International Typographical Union. For this course, which usually requires about two years, apprentices pay \$15 tuition. Efforts are being made to arrange that attendance of apprentices upon evening classes for compositors in the Dunwoody Institute shall be accepted in place of the work by correspondence.

It appears that only a few unions have any regulation as to kind of experiences and training for the apprentice. In some cases, according to their own statement, the provisions of the unions for training are not much more than paper regulations, because the trade is poorly organized. In most cases these provisions are general and do not regulate the shopwork of the apprentice. Only one union, which has no strength outside the railroad shop, has charted any definite and systematic plan of training. Even in some of the more strongly organized unions, such as the bricklayers', the training of the apprentice has been left entirely to the employer and the chances of the trade.

The criticism as to the actual kind of training given to apprentices came from both employers and employees, who found themselves in substantial agreement. All recognized and deplored the entire absence of technical instruction, which all believed the shop never has given and never can give properly. Their statements ran: "Technical knowledge can not be acquired in the routine of the trade." "Drawing and laying out of the work can not be learned on the job." "The apprentice must get his technical training from the outside or from trade papers." "Journeymen are not able to instruct in anything else than the processes of the trade, because they do not have

time." "Technical training must be given by outside agencies, such as the school or trade papers."

The statements as to shop experiences were no less positive: "Modern apprenticeship is no way to train boys, who just have to pick up their trade knowledge." "The apprentice has always been neglected." "Not one out of 25 employers takes any interest in the boy other than paying for a day's work." "Some journeymen are unwilling to teach boys what they know about the trade." "Boys are not kept with one man, but shifted too often." "No time is devoted to the training of apprentices." "The boy runs errands instead of learning trade." "The tendency of the trade is to make the boy a machine hand." "Employers keep boys on one machine too long." "There is no training for the better branches of the trade." "A worker learns by bitter experience long after his term of apprenticeship has been served."

RELATION OF THE SCHOOL TO APPRENTICESHIP TRAINING.

From the foregoing, apprenticeship seems to be on the decline, and employees and employers not only are dissatisfied with it as a means of training new workers but believe that under modern conditions, unaided by other devices, apprenticeship offers little or no hope as a system of preparing youths for the skilled trades. It remains to consider how far the industrial school can be used to supplement or serve as a substitute for apprenticeship.

In considering this question conferences were held with employers and, wherever the trade was organized, with employees, in the following lines: Electrical working, stonecutting, plumbing, carpentry, painting, machine shops, bricklaying, cabinetmaking, automobile repairing and construction, printing, sheet-metal working, hoisting engineering, stationary engineering, steam fitting, plastering, laundering, structural-iron working, dressmaking, and millinery.

The effort was made to learn whether there was any need for school instruction in the trade and whether this should be given (1) in all-day classes, preparing the youth, in part at least, for the trade; (2) in part-time or cooperative classes, taking part of his working time for school training; (3) in dull-season classes, attended for a full day by apprentices already in the trade during the dull season, as in building trades; (4) in evening trade extension classes, extending the knowledge and skill of the apprentice or adult worker; or in some combination of two or more of these types of classes.

Of all the trades above listed only structural-iron workers and laundries held that the school could give no training of any kind. All the others believed there was a need of trade instruction through the schools, although differing as to whether day, part-time, dull-season classes, or evening instruction was needed.

Evening school instruction was favored by all the other trades listed. The survey did not find a single trade where employers or employees believed that evening classes should attempt to train novices for any trade in which they had no experience. All believed that the time given evening instruction was short (about 100 hours a year), and that effort to prepare men for trades in which they had no experience would waste the student's time and the resources of the school. All these trades, however, heartily approved the evening trade extension classes, with their policy of taking men already engaged during the day and giving them practical and technical instruction. The interest of both employers and employees in evening schools of this kind was shown by the hearty cooperation and assistance they gave to the survey in drawing up evening school courses to meet the needs of both apprentices and journeymen already in the trade.

The **part-time school**, for the apprentice or young worker, which takes a part of his working time out of the day, week, or month for instruction in the theory and practice of the trade, was approved by both employers and employees, although only one class of this kind had been formed. In general, both employers and employees thought the fairest plan was for the employer to pay half the apprentice's regular wage during the time given to part-time instruction.

The **dull-season school** met with strong approval from four building trades—bricklaying, plastering, plumbing, and painting.

The question of day classes giving boys who have never been in the trade a part of their apprenticeship training occupied much attention. Much of this centered around the work of the Dunwoody Institute which had established a school that is now preparing boys for entrance into electrical work and telephony, carpentry, and cabinetmaking, machine-shop work, and automobile repair and construction, printing, and presswork.

The employers from these trades welcomed the establishment of these day classes as giving boys a part of their apprenticeship training. They believed that the school would give the apprentice far better training than the shop, and that two years of instruction in the school would more than equal two years of experience in the trade. They looked upon the school as a promising source of supply of carefully trained boys, whose employment would relieve the employer of practically all the objections now found in employing apprentices, particularly in their earlier years in the shop. They strongly believed that to train these apprentices properly the school must be kept in close touch with the trade.

The representatives of the unions heartily indorsed the part-time, dull-season, and evening schools, but raised some questions concerning the day school which are presented here because they reflect the

doubts of organized labor. They said that schools had been established in some communities in the interest of the manufacturer and with the deliberate purpose of breaking up the union; that these schools turned out mechanics too rapidly, without giving them a thorough knowledge of the craft, with a resulting tendency to lower the standard of skill; and that in any day school preparing for the trade there was danger of overcrowding the market with new workers, should more boys be trained than there were positions. It was said: "The effect of this would be unemployment and a depression in wages injurious alike to the older workmen and the boy desiring to follow the trade as a life work." "If the purpose of the day school is to fit the pupils for a desirable skilled occupation, it should not train more than a limited number of workers, otherwise it will defeat its own aim." The largest misgiving as to the day school was "the fear that it might be conducted with ulterior motives rather than to promote a higher order of industrial skill."

While practically all the unions voiced these sentiments, they recognized that the day school had many excellent advantages as a preliminary apprenticeship. They agreed with employers that if the day school was to realize its purpose as to apprenticeship training, there must be more careful selection of youths, more thoroughgoing training than is usual in industrial schools, and close contact with the trade.

The idea of both employers and employees as to the best way the school could serve is shown by the arrangement drawn up in conference and approved by employers and employees for carpentry, cabinetmaking, and printing. These trades are now taught in the Dunwoody Institute. Similar arrangements were made with the employers in telephony and automobile repair and construction, which are not organized. Negotiations with the employing electricians are still pending. The employing machinists did not complete the arrangements for that trade. In the one remaining trade—pressroom work—the union did not complete the arrangements.

What follows, therefore, is a description of apprentice training in the Dunwoody Institute for electrical work and telephony, carpentry, and cabinetmaking, automobile construction and repair, and printing.

It is understood that these arrangements are for the benefit of all the workers in the trades and industries whether organized or unorganized, and whether workers are employed in union shops or otherwise. It remains to point out the significance of these arrangements from the standpoint of apprenticeship.

1. **The selection of apprentices for training.** All boys entering the classes must be over 14 years old. Those taking telephony, electrical work, and printing must have completed the eighth grade, and those fitting for the other trades the seventh grade.

2. A probation period of three months is to be required in each of the trades to test the pupil's interest in and fitness for the work.

3. A two-year period of training is to be provided, including three months of probation, half of each school day being given to actual shopwork and half to academic and technical instruction.

4. Provision is made for the transfer of apprentices from the school to the shop after two years of instruction in the school.

5. Adjustment to the apprenticeship arrangements of the shop. The boy from the school is to have credit for at least two years of shop apprenticeship; to be paid at the beginning the same wage as the apprentice from the shop receives at the beginning of his third year; to be required to pass through the same total years of apprenticeship as the custom or the rules of the shop require.

6. Graduation from the apprentice school will come at the close of the first year of service in the shop, if the apprentice-student can furnish proof of satisfactory service. This makes at least one year of service in a commercial shop outside the school part of the necessary schooling of the student expecting a diploma.

7. Part-time instruction for the apprentice-student will be offered where the employer is willing to give him time off from his daily work to attend the school. This may take place either during his first year as a wage earner or subsequently.

8. An advisory committee of employers and employees from each trade to aid the school in standardizing its courses and method of teaching; this arrangement is to hold for all trades taught in the day school and for those taught in the part-time, dull-season, and evening schools. Courses as approved by conferences with the trades held by the survey are given in Appendix C (see p. 567).

Similar arrangements for "the girls' and the women's trades" have also been made. These include dressmaking, millinery, garment making, salesmanship, and junior nursing, the latter meaning training of girls to be caretakers for young children. These arrangements are practically the same as those for boys and men, with two main exceptions. As no apprenticeship exists in any of these lines a beginning wage for those entering the trade after two years instruction in the Girls' Vocational High School had to be set without reference to any precedent, since none existed. This was placed at "not less than \$8 a week." Since this school is under the control of the board of education the advisory committees have been appointed by that board, while such committees for the boys' trades have been appointed by the Dunwoody Institute.

The four-year technical course for boys in the regular high schools is also a plan of apprenticeship for boys who desire by beginning at the bottom to advance in the business and directive side of industry. This plan is given in Chapter XXIII (see p. 528). After four years

of training in the high schools, employers are to engage these graduates at not less than \$50 a month, and an advisory committee of employers and employees is to aid the school authorities to make effective the training given.

There is no expectation by the school authorities or the trades that this plan of apprenticeship training through the schools will furnish more than a small proportion of the new workers employed in the various occupations. They believe, however, that it will select and train better than would otherwise be possible promising boys and girls, who, because of better preparation, will become the superior workers and leaders after adding trade experience to their school training.

SUMMARY OF THE SURVEY STUDY AND CONCLUSIONS OF SURVEY COMMITTEE.

It would appear from the foregoing study that the following things are true:

1. With the exception possibly of a very few trades, there is little or no apprenticeship of the old form of any consequence in Minneapolis.

2. At present, apprenticeship is so much on the decline in Minneapolis that few of the trades rely upon it as a means of training new workers.

3. The study seems to show from the testimony of the trades themselves (1) that the American boy no longer desires to be apprenticed to the trade under the old conditions; (2) that a growing number of employers no longer desire to be bothered with apprenticeship; (3) that in most instances the training of apprentices is largely a matter of chance experiences; (4) that the efforts which have been made to revive and systematize apprenticeship have not been successful; (5) that employers and employees find themselves unable to cope with the situation.

4. The causes of this decline of apprenticeship are largely inherent in the organization and spirit of American social and industrial life and, therefore, can not be removed.

5. As a result, practically all the trades dealt with by the survey recognized the inadequacy of apprenticeship as a means of training new workers for the trades. While they differed as to its type, all advocated some kind of training and education in schools as a necessary part of apprenticeship training for the future.

These facts seem to warrant these conclusions:

- (1) It would appear from the foregoing study of apprenticeship that higher efficiency in training new workers must come through the schools, as a device for supplementing the shortcomings of apprenticeship. The trades seemed to hold out little hope for self-improvement in this respect. Nevertheless, in the opinion of the

committee, a great deal could be accomplished by the trades themselves, which the school can not accomplish, through the organizing and systematizing of the shop careers of apprentices.

(2) The practically entire absence in the trade of any technical instruction relating to the trade makes the evening school absolutely necessary for giving this knowledge to promising, ambitious workers.

(3) The dull-season school seems to be the best device in the case of the building trades for giving the apprentice already in the trade not only the technical knowledge bearing upon it but the experience in processes which he can not gain with the employer whose work may be highly specialized. In order that this plan may be successful, the employer should make it possible for the apprentice to attend such a free school during the dull-season period.

(4) In the case of trades and occupations other than the building trades, there is a great need of part-time and continuation classes which will claim a part of the working time of the apprentice or young worker for further instruction, according to his needs.

The committee believes that the trade understandings which have been worked out between the industries on the one hand and the public schools and the Dunwoody Institute on the other promise to provide the industries of the city with capable, well-equipped young persons, who will make their way up through apprenticeship to leadership in the industry.

The features of these understandings specially worthy of note are: (1) the three months' trial period in the school; (2) the two years' instruction in practical, technical, and academic subjects; (3) the agreement of the employer to use the school as the first course of supply in engaging new workers; (4) the approval of the arrangements by the union in the trade; (5) the placement of the pupil in the occupation at a beginning wage equal at least to that of a third-year apprentice; (6) the withholding of the diploma of the school for one year until proof of satisfactory service as a wage earner; (7) an advisory committee for each line taught, made up of employers and employees, to assist the school in standardizing the work.

There can be little doubt here, as elsewhere, that when closer cooperation has been established between the shop and the school, the part-time school will be an important device for reaching and training young workers in the trades and industries. There is need of continued study of the possibilities of part-time schooling in Minneapolis, both in order that the schools may learn how to deal with the problem and in order that the industries may learn to rely upon the school for help in educating their young people. In this connection, the committee believes that the employer should pay full wage for attendance upon such part-time or continuation classes.

CHAPTER VI.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR THE BUILDING TRADES?

The following table lists the groups of the building trades here considered, with an estimate of the number of persons employed in 1914-15, based on figures furnished by the Master Builders' Association and the unions for the different trades. Occupations are later described in the order given in this table.

Contractors	250
Bricklayers and masons.....	1, 200
Carpenters	6, 435
Electric wiring men.....	320
Holisting engineers.....	75
Laborers (all kinds).....	6, 000
Lathers.....	200
Painters and decorators.....	2, 000
Plasterers.....	500
Plumbers and gas fitters.....	500
Sheet-metal workers.....	430
Stationary engineers.....	3, 500
Steam fitters.....	375
Stonecutters.....	30
Structural-iron workers.....	100

21, 915

In the construction of a building of any importance typical procedure is as follows: The owner, having decided upon the location, size, and approximate outlay, engages an architect to draw plans and specifications and to supervise the construction and makes a contract with a general contractor for the construction of the building.

The work of supervising the construction is done by the architect or by a supervisor whose duty is to see that materials and details of construction conform to specifications. He represents the owner and has no authority over the workmen. On large buildings a "clerk of the works" is sometimes employed by the owner to look after materials and insure the progress of the work.

The general contractor often sublets contracts to specialty contractors for such work as lathing, plastering, electrical work, heating, plumbing, and decorating. He usually employs tradesmen to do bricklaying, carpentry, and certain other work.

CONTRACTORS.

The contractor is essentially a business man with some capital or the necessary credit. He must have considerable knowledge of building materials and processes of construction, must know how to buy materials, estimate amount of material needed and of time required to complete the work, manage his employees so that no time will be lost, and inspect the construction and know if it is according to specifications.

SUMMARY OF THE SURVEY STUDY AND CONCLUSIONS OF SURVEY COMMITTEE.

In order to estimate materials, the building foreman must be able to read plans drawn by architects and others and from these plans to estimate the quantities of materials needed. He must interpret specifications, be familiar with building ordinances, and understand the laws governing contracts and employers' liability. In many cases building foremen would be greatly helped toward promotion and greater responsibilities with larger concerns by the special courses for journeymen in the various building trades which are suggested at various points throughout the chapter. Probably, however, most of them would find most profitable the courses in such subjects as plan reading, estimating, and interpretation of specifications.

BRICKLAYERS AND MASONS.

The growing demand for fireproof buildings and the increasing number of apartment houses make bricklaying an important industry in Minneapolis. While few firms specialize in it, all general building contractors do brickwork.

The United States Census of Occupations for 1910 reported 1,046 bricklayers and masons in the city. The Builders' Exchange reports 760 at present. Employers and employees agree that the bricklayers, with laborers, mortar mixers, apprentices, and foremen total approximately 1,200 men, an increase of 150 in 1915 over 1910. Many bricklayers live in Minneapolis and work outside the city.

Bricklaying is a somewhat hazardous occupation. Casualty companies rate it as less hazardous than structural-iron erecting and outside electric wiring, but more hazardous than painting, carpentry work, steam fitting, or iron-foundry work. The danger is chiefly from falling brick or stone, or from injury caused by falling from the scaffold. While the work requires constant exposure to the weather, it also tends to conserve the health.

Specialization and absence of instruction for beginners is hampering the industry to a marked degree. Lack of opportunities for extend-

ing their knowledge of the trade prevents journeymen from receiving promotions, though superior ability or increase in efficiency is quickly recognized. The bricklayer who becomes capable of superintending a building may expect advancement, but his work is such that he is not called upon to read plans or estimate materials, or to do anything which the position above his present one requires.

The journeyman bricklayer receives a rate of 70 cents an hour and works eight hours a day. The stonemason is paid 65 cents and works eight hours. The busy season for the bricklayer is from April 1 through November. Practically no bricklaying is done in January, February, and March. The busy and slack seasons vary with weather conditions and the amount of building.

The trade is about 95 per cent organized.

Beginners are usually between 16 and 20 years old and those who wish to become journeymen are indentured as apprentices. Apprenticeship lasts three years, after which the apprentice automatically becomes a journeyman. A bricklayer is at his best from 22 to 55 years old.

Usually the apprentice is the son or friend of a journeyman, a relative or friend of the contractor, or a boy who comes seeking employment. There is no systematic method of selection.

In brickwork five classes are usually employed—laborers, mortar mixers, apprentices, journeymen bricklayers, and foremen. Where there is stonework, stonemasons are employed.

THE LABORER.

The number of laborers on a building varies with the height of the walls, one laborer usually being employed for every bricklayer on the ground floor, three laborers to two bricklayers on the second and third floors, and two laborers for each bricklayer on the fourth and fifth floors.

Thus the number during the busy season varies from 350 to 500 men. They are usually between 18 and 50 years old and receive from \$2 to \$2.25 for an eight-hour day. If efficient a laborer may receive \$2.50, but does not advance to any other position.

The laborer carries all material to place, assists in building scaffolds, loads brick and mortar into a wheelbarrow and wheels it to the journeyman or to the elevator.

The hod carrier is a thing of the past in the bricklaying craft of Minneapolis. Instead of carrying material up a series of ladders, the laborer now wheels it on the platform of a temporary elevator which carries it up. A laborer at the top wheels it where needed. His tools are the shovel and wheelbarrow, and he is not allowed to handle the bricklaying tools. In building scaffolds he puts together stock materials with bolts and clamps.

He must be strong, healthy, able to lift heavy loads continuously, have ordinary intelligence and be capable of interpreting and obeying orders. He has no written or printed instructions to follow, plans to read, or arithmetical computations to make other than keeping a record of his time. A common-school education is desirable, but not essential. The knowledge needed concerning his work can only be learned on the job.

The laborer is an unskilled workman. He is often a nonresident, seeking temporary employment. He requires no special training and receives none.

THE MORTAR MIXER.

There is usually one mortar mixer to every five or six bricklayers. This means between 75 and 100 in the busy season. The typical mortar mixer is between 20 and 50 years old and gets \$3 for a 9-hour day.

He arrives before the other workmen and prepares the mortar, remaining after the bricklayers to cover his vat. He screens the sand, shovels the right amount of sand, cement or lime into the vat, adds the water, mixes the material, and adds coloring material if necessary.

His work requires health and strength, as it is heavy and he is exposed to all kinds of weather. Average intelligence, but no superior knowledge or ability, is required. He must understand the action of water upon lime and cement and the proper mixtures of materials for different grades of work. His tools are the shovel and hoe.

All the knowledge and skill required can be learned in a few weeks on the job, and it would be almost impossible to learn it otherwise. Usually when a new mortar mixer is wanted a laborer is put on the work.

While this work offers no opportunity for promotion, a mixer who always supplies the bricklayers with mortar properly mixed will have regular employment and be advanced in pay.

The mortar mixer is being rapidly displaced by the more efficient mortar-mixing machine, which is operated by a gas engine and automatically dumps the mortar into a wheelbarrow.

THE APPRENTICE.

At present about 30 apprentices are employed in bricklaying. The rules of the union for organized shops allow one apprentice to each firm. In addition, any bricklayer may take his son as an apprentice. An apprentice to each firm would mean approximately 125 in the city.

The apprentice is between 16 and 20 years old, receives as a general rule 20 cents an hour the first year, 30 cents the second, and 40 cents the third, and serves three years.

He is allowed to use all the tools of the trade and, if the journeymen are kindly disposed, is taught to do all the work of a journeyman. At first he is allowed to work on a straight wall and after he can lay it plumb and straight is allowed to try a corner. It usually is more profitable to keep him on work that he can do well, and consequently he is taught very little.

The apprentice must be fairly robust and have good health. To advance he should have a common-school education. If he understands a blue print and knows something about building construction he may expect rapid promotion. If he is content merely to draw his pay as a bricklayer the work is laborious and uninteresting.

As at present organized the trade offers little opportunity for the apprentice to learn all he should about bricklaying. Many contractors specialize, and if he learns his trade with a specialist he may have no opportunity to learn other branches. When unusual work is to be done or work requiring considerable skill, an experienced workman is assigned to it and the apprentice gets no opportunity even to watch it.

Such work as building chimneys, paneled work of all kinds, building in windows and doors, corbeling, laying the more unusual bonds, making arches, bow windows, laying fireplaces and mantels, laying pressed brick, and all kinds of ornamental work is done by more experienced workmen and is not taught to the apprentice. If he is to learn these specialties some means must be provided outside of the regular routine. Blue prints and plans are usually read by the foreman and the apprentice never sees them. He is not taught to estimate costs of time or material, and pays no attention to building regulations, as the foreman is responsible for that.

As there is little work for the apprentice in January and February, he might well attend all-day school during these months for this instruction. These classes might be open to unemployed journeymen also.

THE JOURNEYMAN.

There are approximately 400 journeymen bricklayers and stonemasons employed in Minneapolis. Of these, between 60 and 70 are stonemasons. The work of the stonemason is constantly decreasing on account of the increase in the use of concrete.

Journeymen are usually between 22 and 50 years old. The bricklayer receives a rate of 70 cents an hour, the stone mason 65 cents an hour, and both work eight hours a day. If a man is extraordinarily efficient he may be paid in advance of the union scale.

The union rules specify that all clay products, stone or substitutes of stone, set with or without mortar or cement are to be set by a bricklayer or stonemason. This includes walls, columns, chimneys, foundations for machinery, tunnels, fireplaces and mantels.

The work does not require great strength, but a physique strong enough to withstand exposure to all kinds of weather. Merely to lay brick does not require much thought or great intelligence. The skill lies in using the trowel and keeping the work straight and plumb. But if the journeyman hopes to become a foreman, or to advance, he must know the different types of bonds used in brickwork and the advantages and disadvantages of each and be able to lay the different arches and know their relative strength and advantage. He must be able to read blue prints, interpret specifications, estimate quantities of materials needed, and know their cost and where to buy them.

Evening classes in plan reading and estimating, strength of material, ornamental brickwork—such as fireplaces and mantels, pilasters and columns—proper construction of different arches, the different bonds and how to lay them, would, in the opinion of the trade, be of great value to apprentices and journeymen.

THE FOREMAN.

A foreman is employed on each job. He plans the work and is responsible for following plans and specifications.

During the busy season between 80 and 100 foremen are employed in brick construction in the city. The foreman is a journeyman who has been promoted to his present position. He receives 75 or 80 cents an hour and works eight hours, is usually between 25 and 40 years old, and a man of intelligence and executive ability.

His work requires familiarity with proper methods of construction, and ability to read and interpret plans and specifications, and to manage his crew so as to get the work done with a minimum waste of time and material.

His only possible promotion is to the position of building superintendent; but to get this he must be familiar with all the processes of building. This position is usually filled by a carpenter, as few bricklayers are competent to fill it.

The foregoing analysis is, in the opinion of representative employers and employees, a correct one, but all agree that there is great need in Minneapolis for technical instruction in the trade.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

After a careful study of the situation made during the progress of the survey, both employers and employees in the trade approved a plan to open evening classes in the Dunwoody Institute for journeymen bricklayers and masons, dealing with the different kinds of bonds and advanced problems of fireplace, mantel, and arch construction. The survey committee is of the opinion that opportunities should be afforded journeymen bricklayers to attend classes

in architectural drawing, and also general classes in plan reading and estimating for the building trades. Such classes will open opportunities to ambitious journeymen for advancement to foremen's positions.

The conferences also developed the following plan which has the approval of the survey committee:

The Bricklayers' Union has agreed to require all apprentices in the organized shops to attend during the entire three years of their apprenticeship, at least five days a week, an all-day school at the Dunwoody Institute for the months of January and February. The contractors of both organized and unorganized shops have agreed to pay the apprentice one-half of his usual wages while attending the school.

An advisory committee from the trade is to assist the authorities of the school in standardizing the work of the school and in carrying out the trade understanding. One-half of the time spent in school shall be devoted to the practical work of bricklaying and one-half to technical and academic work, to consist of drafting, applied science, and cost estimating.

CARPENTERS.

The carpenter's trade is perhaps the most important in the building industry. There is work for a carpenter in nearly every building project. As it is necessary for him to prepare a building for workmen who are to follow, he must have, in addition to thorough knowledge of his own trade, some knowledge of all of the other building trades.

There are about 6,400 carpenters in Minneapolis, an increase of about 1,000 over the number reported by the 1910 census. The secretary of the Builders' Exchange estimates 6,435 in 1914, and the State Department of Labor reports 133 firms employing carpenters. The rapid increase has been caused by the growth of the city and the need for new buildings and for remodeling present ones.

The standard minimum wage rate of journeymen is 50 cents an hour for an eight-hour day. A few shops pay as low as 45 cents and run a nine-hour day. The slack season is in January and February, and the force is generally reduced in June and August; the rest of the year is fairly busy.

According to the union, the trade is about 50 per cent organized. The union takes on no apprentices under 17 or over 22 years old. The age of maximum usefulness is from 25 to 55 years. On account of present conditions, workers are being recruited from Canada and from other parts of the country.

The trade is somewhat hazardous, as is shown by the rate charged by the casualty companies to employers for protection against accidents. Carpenters are rated as less hazardous risks than structural-iron workers, outside wiremen, bricklayers, and outside painters, but more than steam fitters, iron-foundry men, bakers, or machinists. The workmen must be able-bodied and able to withstand exposure to weather conditions.

Employers seem fairly satisfied with the present apprenticeship system, but feel that the industry is hampered by lack of technical knowledge on the part of workers. With no special training the apprentice must acquire knowledge and skill from observing other workmen and doing simple work.

Four grades of workmen are employed in carpenter work by contractors: laborers, apprentices, journeymen, and foremen, in the order, theoretically, of promotion. In fact, laborers rarely become apprentices or journeymen, but apprentices do become journeymen, and foremen are almost always selected from journeymen.

THE LABORER.

Approximately 350 laborers are employed in carpentry work in the city. They are 18 to 30 years old and get 25 cents an hour, usually for a nine-hour day. They do all the heavy work, carrying lumber, nails, and hardware, and doing work not requiring the handling of tools. In some shops not controlled by the union the laborer is permitted to use the simpler tools.

To do his work the laborer must have considerable strength and be able to stand exposure to hot and cold weather. The work does not require high intelligence or skill; he does not have to read drawings or specifications, but should be able to understand directions and know what is needed without being told.

A few workers are employed all year by the same contractors. The majority are usually transient and do not stay long in one place. There is no system of employment. The first applicant who appears able to do the work gets the job.

As the work requires only physical strength and agility and is entirely unskilled, it would be futile to establish any training to prepare men as laborers. However, if the laborer is to advance to journeymanhood in any line, he must receive elementary instruction.

THE APPRENTICE.

There are approximately 50 apprentices in the carpenter's trade in Minneapolis. They are 17 to 22 years old and are paid during the first year, \$1; the second, \$1.50; and the third, \$2.25, for an eight-hour day. The third year completes the apprenticeship, and at its close

the apprentice is usually accepted as a journeyman. There is no systematic method of employment or selection of apprentices. The majority are Minneapolis boys who have completed the eighth grade and can not go to high school. If the apprentice shows interest in his work and improves, his pay is increased and he advances automatically.

There is no provision for systematic training of the apprentice. He is usually put to work to help the journeyman. If the work permits he is taught to use the tools, and as he acquires skill is assigned to work which will give him practice. The amount of instruction which he receives depends almost entirely upon the relations between apprentice and foreman.

The work requires that the apprentice be able-bodied but not above average strength. He should be nimble and able to climb about on narrow planks and scaffolds. The better positions require at least a common-school education in order to read plans and specifications and estimate materials. To advance to journeymanship he must acquire skill in use of tools, a knowledge of building construction, and ability to lay out work, frame buildings, construct roofs, build staircases, and to do other similar work.

Employers feel that the chief deficiency of apprentices is lack of interest and desire to gain proficiency. This may be due to absence of opportunity for technical instruction.

A boy with skill in the use of tools and knowledge of building construction will find entrance to the trade at larger pay than if untrained. The trade agrees that a day school giving two years of training would help prepare the boy to enter as a third-year apprentice. During that time he should receive instruction in use and care of woodworking tools, common methods of fastening woodwork, use of the steel square in laying out work, house and roof framing, use, care, and adjustment of woodworking machinery, knowledge of building hardware, and supplementary classroom instruction in mathematics and applied science, and in making and reading working drawings.

THE JOURNEYMAN.

Normally over 4,000 journeyman carpenters are employed in Minneapolis. They are from 22 to 60 years old and are paid 35 to 55 cents an hour for an eight-hour day. Some shops outside the jurisdiction of the union pay 35 to 45 cents an hour for a nine-hour day.

The work done by the journeyman carpenter may be understood from the following statement issued by the Carpenters' Union:

It extends over all journeyman carpenters, or joiners, stair builders, ship joiners, millwrights, planing-mill bench hands, cabinetmakers, car builders, or operators of woodworking machinery. It extends over all men engaged in the occupations enumerated, whether on the

building in its erection or repair, or employed in the preparation or manufacture of material for the same, including all metal-covered trim, hollow sash and doors, and hollow-steel trim.

It extends over men engaged in putting up all kinds of wood molding, putting up "run," strips for plumbers, the opening through floors, joists, or partitions where coming in contact with wood, also the setting of all woodwork in toilet rooms; fastening of all wood cleats to ironwork; cutting up and hanging all rough lumber between girders and joists, for fireproofing or concrete centers, and all forms used in concrete work; the setting of all sash, doors, windows, and other frames; the building and setting of all centers made of wood, the putting on of plaster boards and putting on of all plaster grounds, and also the erection of furring for cornices where wood is used; the building of all scaffolds where any carpenters' tools are used; the building and construction of all derricks; making of mortar boards; boxes and trestles; putting in "needles"; shoring of buildings; raising and moving of buildings, etc.; the nailing and cutting of all stops in doors and windows, the framing of all false work, derricks, etc., when applying to structural-iron work.

The journeyman should be able-bodied, able to stand exposure, and get about on scaffolding, and especially qualified to work in the cold. He needs no school education beyond the eighth grade, but must have thorough technical knowledge of his trade, including roof construction, stair building, the construction and fitting of building trim, interior finish, and other work of like nature; also including thorough knowledge of all kinds of wood and lumber and of the fitting of buildings and hardware.

To do this work he must have considerable knowledge of mathematics and plane geometry. His skill consists in knowing how to handle tools and keep them in first-class condition.

Carpenters in Minneapolis feel that there is great need for evening classes in roof construction, house framing, stair building, construction and fitting of building trim, interior finish, plan reading and estimating of materials, and architectural drawing, opportunity for advancement depending not only on skill, but also on ability to read plans and estimate materials. The latter requires instruction in arithmetic and the use of formulas given in carpenters' handbooks.

THE FOREMAN.

Between 300 and 350 foremen are usually employed in carpentry work in Minneapolis. They receive 55 to 75 cents an hour and work eight hours a day. The majority are 30 to 60 years old.

The foreman lays out and supervises all the carpentry work of the building. As he usually has been promoted from a journeyman, he has all the physical and mental qualities required, and must also have a knowledge of plans and specifications and be able to manage men.

The trade feels hampered by the lack of competent foremen, which probably is due to the absence of opportunities for journeymen to receive adequate instruction for their work. Competent foremen usually find ready employment, and if they have sufficient technical knowledge and ability positions as building superintendent are open to them.

With adequate provision for instruction, carpenters feel that the trade is a desirable one, and offers opportunities for advancement. With instruction, an apprentice can look forward to journeyman-ship and foremanship, and, if willing to devote time and study to his work, has opportunities of advancement to contractor or architect. The desirability of the trade is evidenced by the willingness of journeymen for their own sons to enter it.

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SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

A result of agreements reached before the formulation of this report, the following plan was developed. It was agreed that a two-year course of training in preparing boys for advanced apprenticeship in the carpenter's trade would be conducted in the Dunwoody Institute. The first three months of this period will be used as a probation period for the purpose of testing interest and fitness for the work of a carpenter. Upon completing the two years' training, the boys so desiring are to be placed in the shops of the city at an initial wage of \$2.25 a day, the diploma of the school being withheld until proof of satisfactory work is furnished at the close of one year. Contractors who are parties to this understanding agree that they will use the pupils completing this two-year period of training in the school as their preferred source of supply in employing new workers. A copy of this agreement is given in Chapter XXIII (see p. 526).

Contractors and employees in Minneapolis have approved of evening classes in architectural drawing and classes giving instruction in such subjects as advanced problems of construction, like hip and valley roof framing, stair building and handrail work.

It is also believed that general courses for the building trades in plan reading, estimating, and interpretation of specifications would be of value to the more ambitious workers aiming at foremanship or setting up of their own establishments.

The survey committee approves the above classes and believes that the experience of schools carrying this work shows that, outside of courses in architectural drawing, the only work that attracts journeyman carpenters to evening classes in any numbers is that which gives opportunities for laying out advanced problems in construction, as indicated above. Such instruction should take form

in actual laying out of practical work, which should then be carried far enough in execution thoroughly to illustrate the method. Such courses give the opportunity of preparing for high-grade work or for foremanship. The courses in plan reading and estimating of material and in specification writing will reach only the particularly ambitious workers.

ELECTRIC WIRING MEN.

It is almost impossible to ascertain the number of workers engaged in electrical wiring in the building trades. Firms employing electric wiring men usually engage in other lines of electrical construction and wiring men have to do other electrical work. The secretary of the Builders' Exchange estimates that 320 men are engaged in inside wiring in Minneapolis.

The work includes the preparation for and installation of electric wires for all purposes within buildings and the installation of electric appliances and fixtures for which the wires must be run; this includes such work as wiring for lighting, heating, power, telephone, bell, signal, and elevators; also installation of outlet boxes, switchboards, lights, switches, and fuse blocks.

Casualty companies rate the work as less dangerous than any other building trade, the basic rate employers pay for protection against accidents being 84 cents, while for carpenters it is \$2.77; outside electricians, \$4.73; structural-iron workers, \$8.93.

There is considerable fluctuation in the busy season. From September 1 to the end of February the work is usually slack. In the busy season workmen work eight hours a day. Journeymen usually receive \$4.50 per day.

The union says it has 80 per cent of the journeymen in its organization, but the employers give the percentage as "about 50."

The demand for men to do this work has been steadily increasing for 8 or 10 years, but the supply now seems adequate. Employers state, however, that there is a demand for exceptionally competent men. Because of the changing demands upon workmen, caused by the progress in electrical work and the inability of older men to adapt themselves to changing conditions, men over 45 years old are not sought by employers.

New men are supplied from many sources. High school boys with fundamental knowledge of electricity can do the work of inside wiring men without serving a long apprenticeship. Young men from technical schools enter the trade without serving any apprenticeship. Many boys enter the trade as apprentices.

There does not appear to be any organized apprenticeship in the trade. Boys enter shops as helpers and as rapidly as they are capable are advanced to journeymanhip. The union rules provide for four-

year apprenticeship, the apprentice to receive for the first year the wage agreed upon with the employer, usually \$8 to \$12 a week; the second year, \$2.50 a day; the third year, \$3, and the fourth year, \$3.50. The State law provides that all electrical installation must be done by persons licensed by the State board, and that not more than one apprentice shall be employed for every two journeymen. The city ordinance provides that electrical licenses shall be divided into four classes: Class A, including all branches of installing, operating and maintaining electric wires, apparatus and plants; class B, only the manufacture and installing of electric and combination fixtures; class C, only wiring electric signs; class D, only minor alterations, extensions, and repairs to existing systems of wiring. It provides further "that no individual, firm, or corporation shall enter upon the erection, construction, alteration, or changing of any electrical installation work or wiring in the city of Minneapolis until proper application has been made to and approved by the inspector of buildings."

THE APPRENTICE.

Between 60 and 75 apprentices are now employed in inside wiring in the city. The union rules provide that the apprentice shall be between 18 and 22 years old. The State law permits no one under 16 to be apprenticed and no person under 21 to have a journeyman's license.

A four-year apprenticeship is not observed in all shops. Promising boys are engaged as helpers and work with the journeyman, doing the more unskilled work, such as boring holes in the joists and studding, chiseling holes in brick walls, putting in tubes and knobs, cutting conduit pipe and putting it together. This work is all laid out by the journeyman, who, if kindly disposed, may give the boy considerable instruction.

The boy must be able-bodied and able to climb around in buildings. Cutting and bending pipes requires considerable strength. He must be keen and alert, interested in the work, and willing to devote considerable time to study of the trade. Work as a helper does not demand much schooling, but as this position is only temporary and advancement depends upon acquiring considerable knowledge, the boy should have at least an eighth-grade, and, still better, a high school, training.

He need not have any knowledge of electrical work as a beginner, but should acquire this as rapidly as possible. He should have some mechanical aptitude and an interest in electrical work. When he has gained sufficient knowledge and skill he is advanced to the position of second-class journeyman.

THE SECOND-CLASS JOURNEYMAN.

The second-class journeyman holds a position between apprentice or helper and first-class journeymanship, corresponding to the "two-thirder" or junior journeyman of other trades. He usually has a license to do certain classes of work and assumes all responsibility therein. He may work on outlet boxes, switchboards, fuse blocks, etc.

The second-class journeyman should devote considerable time to gaining a technical knowledge of electrical work and acquiring skill in the use of electrical tools, study city ordinances, State laws, and underwriters' rules governing electrical work, familiarize himself with electrical handbooks and, by learning to read plans and understand specifications, become qualified for first-class journeymanship.

Employers find the most common deficiency to be lack of interest and unwillingness to devote time and energy to a study of electrical work. On the other hand, the city does not provide for this needed instruction, and the workman is not altogether to be criticized. Workmen feel that evening classes in theory of magnetism and electricity, carrying capacity of wires, city building code, and underwriters' rules would assist them greatly.

THE FIRST-CLASS JOURNEYMAN.

The first-class journeyman is usually licensed by the State and by the city building inspector to do all classes of electrical installation. He must be capable of assuming responsibility for the work and usually has served as a helper and second-class journeyman, although graduates of technical schools are often granted licenses by the State board. He is called upon to install complete circuits for electric bells, telephones, elevators, and electric machines, such as motors, vacuum cleaners, washing machines, and similar appliances, and must understand the building code, underwriters' rules, proper sizes of wire for different circuits, amount of current necessary for operating various machines, and be expert in the use of the tools of his trade.

This requires skill in the use of tools and considerable technical knowledge, which can be acquired only by considerable study. Many journeymen have taken instruction in the theory of their trade through correspondence at considerable expense and feel that evening classes would greatly benefit them.

THE FOREMAN.

The foreman in the electric shop usually receives \$4.50 a day to \$150 or \$175 a month. His duty is to manage all the work of the shop, plan work for the different crews, keep work progressing, and supply material as needed. He must keep accurate records of all work and the time and material used. This requires executive ability, fore-

sight, and tact in handling men, customers, architects, and engineers. He must understand plans and specifications and be competent to judge the work that is done. Occasionally he is a graduate of an electrical engineering school. Technical graduates, as a rule, however, are not content to devote their time to wiring, as their training has fitted them for higher work.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

As advancement in wage opportunity in electrical work is dependent upon the technical education of the worker rather than upon the manipulative skill in handling tools and materials, although this is essential, it is recommended that a general evening course be provided in electric trade science dealing with the conception of the electrical circuit, electrical units, Ohm's law, carrying capacity of wires, and simple tests of line and machine circuits.

In regard to preparing for entrance to the trade, those engaged in the industry feel that there is a great need for two-year courses in which boys would receive fundamental instruction in the theory and practice of electrical wiring.

Therefore, during the progress of the survey, employers and employees in electrical work in Minneapolis and the authorities of the Dunwoody Institute agreed that such day and evening classes should be conducted at the Dunwoody Institute, and that employers should use the boys coming out of such day courses as their source of supply of new workers in the trade. A type of this agreement is given in Chapter XXIII (see p. 526).

HOISTING ENGINEERS.

Increase in number of tall buildings and regulations concerning fireproof structures, and the use of machinery for elevating materials, have called for more hoisting engineers in the city. Approximately 75 hoisting engineers are employed here. There are 58 members in the Hoisting Engineers' Union, which comprises only men operating engines. The position is not especially attractive because of low pay, irregularity of employment, nervous strain, and possible loss of life which might attend any mistake.

The union scale of pay is 50 cents an hour for a 9-hour day. As a rule, no work is done on Saturday afternoons. The busy season is the same as in other building trades, with January and February practically idle. At this time, however, hoisting engineers are in demand in ice houses.

The hoisting engineer often obtains his first experience with the pile driver or steam shovel, or in a stone quarry. There is no apprenticeship and no systematic method of training for the work.

The man in charge of the engine must have an engineer's license, which he secures on passing an examination by the State boiler inspector. Though there is no system of training, the supply of men qualified to operate engines is adequate.

The most common deficiency of hoisting engineers is lack of knowledge of strength of materials and devices used in the work, and of weights of loads. Serious accidents may result from a misjudgment of the strength of a cable or of the weight of a load.

The work of the engineer consists in keeping steam at a sufficiently high pressure and in operating his engine in response to signals from men on the building. It is essential that he respond immediately to the signals, start and stop his engine at the proper time, and swing the boom of the derrick in the proper direction. Often both hands and sometimes both feet are required to shift levers. Liability of serious accident causes constant nervous strain.

Ability to operate a hoisting engine can not be gained elsewhere than on the job. The knowledge concerning the engine is largely the same as that of the stationary engineer; and training should be the same as for such engineers.

CONCLUSIONS OF THE SURVEY COMMITTEE.

The study of the conditions under which the hoisting engineers work does not seem to warrant the establishment of special classes. The more ambitious men in this trade might profit by the courses established for stationary engineers.

LATHERS.

Lathing, formerly part of the carpenter's work, has become a special trade and it is now done only in small communities by the carpenter. The use of wall board has not materially affected the business, and the increased use of metal lath for exteriors has increased the work for the lather.

It is difficult to ascertain the number of contractors or "boss lathers," for they seldom have an office or regular place of business; there are 28 in the contractors' association and about half that number outside. There are approximately 200 lathers in the city, and the demand for men is increasing. In the busy season the supply does not equal the demand, while in the dull season the reverse is true.

The lather's work is light and, except when nailing metal lath outside, he is not exposed to the weather. In doing metal work, he sometimes has to work on high scaffolds. He works eight hours a day at \$3 to \$4.50. The dull season is January, February, and March.

The union says the trade is about 75 per cent organized. An apprentice is generally from 18 to 21 years old. He enters into no agreement with the employer. He simply goes to work and keeps at it until he can put up 1,400 laths a day, when he becomes a third-class journeyman. This requires from one to two years, depending upon ability. The rules of the union provide for one apprentice to every 30 journeymen, which is about the average for the trade.

Regularly five classes of workmen are in the trade—apprentice, first, second, and third class journeymen, and contractors, or “boss lathers.” Occasionally on large jobs laborers are employed to carry the lath. The boss lather is generally the foreman.

THE APPRENTICE.

The apprentice is usually from 18 to 21 years old. He works eight hours a day at \$1.25 to \$3, depending upon the number of lath he can put up. In taking on new apprentices, the sons of journeymen and contractors are generally preferred, there being no other rule of selection.

The apprentice starts on the same work as the journeymen, all of which he can learn in a few hours, but it takes much practice to acquire speed. Speed can be gained only on the job and, as the apprentice is paid according to speed, the present plan satisfies the contractor.

The work is light and easily learned so that the apprentice needs only average physical and mental capacity. In order to become a foreman or contractor, he should have at least a common-school education.

THE JOURNEYMAN.

There are approximately 200 journeymen lathers in the city, including those doing contracting, divided into first, second, and third class workers, according as they can put up 1,800, 1,600, or 1,400 laths a day. If the journeyman is a member of the union, his standing is determined by the organization, otherwise the contractor pays him what he thinks he is worth, and sometimes more than the rule. Metal lathers are graded as first, second, and third class, according to their standing. The majority of both wood and metal lathers eventually become first-class journeymen, but some indifferent and indolent ones never rise above the second or third class. About two-thirds live in Minneapolis and work steadily, and one-third are principally nonresidents or “floaters.”

A journeyman is at his best between 21 and 55 years old. He works eight hours a day at \$3.50 or \$4, depending upon his standing as third, second, or first class man. If extraordinarily efficient, he may receive \$4.50 during the busy season. The work of a journey-

man as defined by the lathers consists of: "Erecting and installing of all light iron construction; furring; making and erecting brackets, clips, hangers; wood, wire, and metal lath; plastic board or other material which takes the place of same, to which plastic material is adhered; cornice beads; all floor construction; arches erected for the purpose of hauling; plastic cement, concrete, or other plastic material."

Wood lathing is too familiar to need detailed description. Each lath is four feet long and the tool used is a lathing hatchet. The lather fills his mouth with nails, using both hands to place the lath and the nail, and his tongue to supply the nail in proper position. Metal lath is sometimes simply nailed up like wood lath. In what is termed ironwork, light wire strips known as carrying iron are first put in place. Tied at right angles to these with wire clips are other light iron strips called furring to which the metal lath is tied. Projecting beams are surrounded by iron brackets to which a pencil rod is tied to hold the lath. The journeyman carries, cuts, and fastens in place all material. There is not sufficient metal lath work in Minneapolis to pay men to specialize in it. There are, therefore, two classes of journeymen, one doing both metal and wood lathing and one only wood lathing.

Like the apprentice, the journeyman needs only average physical and mental capacity. Journeyman's work does not require any special education; the position of foreman or contractor requires at least a common-school education.

He must understand thoroughly how to put up wood and metal lath. The process is quickly and easily learned, but efficiency depends entirely upon speed and the only way this can be acquired is by continual practice.

THE FOREMAN.

Nearly always the foreman is the contractor and has been a journeyman. The contractor may have men working on more than one building, but acts as foreman on all except very large jobs. The foreman may be from 25 to 60 years old, generally works with the journeymen, and by the rules of the union receives a dollar a day more than a first-class journeyman.

It is the foreman's duty to lay out the work and see that it is done properly. He also measures the work and figures the yardage. He should be able to handle men, read simple plans, and measure accurately the amount of work done. A common-school education equips him to acquire on the job the knowledge necessary for efficiency. To do contracting he must also be able to estimate cost of material and labor. Contracting is all done by the yard and not by the job, so that estimating does not involve plan reading.

Any journeyman with the qualifications outlined, sufficient capital to meet one or two pay days, and the initiative to obtain a lathing contract can become a "boss lather" on wood jobs. Contracts for metal lathing require more capital, as metal jobs are, as a rule, more extensive than wood jobs.

CONCLUSIONS OF THE SURVEY COMMITTEE.

As efficiency in wood lathing depends on speed rather than on skill or expert knowledge, and as speed can be gained only through practice in the work, it is clear that a course in lathing would be unnecessary and unprofitable.

PAINTERS AND DECORATORS.

Approximately 2,000 painters and decorators are employed in Minneapolis. The United States Census reports 2,017 painters in the building trades in 1910. The secretary of the Builders' Exchange estimates 1,683 painters and decorators on buildings, not including sign painters or wood finishers in factories. The growing use of plaster or stucco as outside finish and the tendency to simplicity in interiors have held the trade nearly constant notwithstanding the growth of the city.

The outside painter is liable to injury from falling from scaffolds. Casualty companies rate his work as more dangerous than that of the carpenter, steam fitter, or woodworker, but less so than that of the bricklayer, sheet-metal worker, or structural-iron worker. Employers and employees agree that while few painters die of lead poisoning or kidney trouble contracted in the work, it is the most unhealthful of the building trades.

Eight hours constitutes a day's work, and, as a rule, painters do not work Saturday afternoons. The busiest months are April, May, June, September, October, and November, the less active, July and August. Practically no painting is done on buildings in January, February, and March, but some painters find employment in automobile repair shops and furniture factories. Painters and decorators on buildings receive 50 to 60 cents an hour. Approximately 80 per cent of the journeymen painters and decorators in the building trade are members of the union. A man is at his best between the ages of 21 and 50.

Conditions indicate no need for a large number of additional painters in the trade. The present number of apprentices, and the influx of painters from other cities, furnish an adequate supply. There is a constant demand, however, for painters with artistic ability, and these will find ready employment and fair remuneration.

As a large majority of the painters are in union shops the apprenticeship system is practically governed by union rules, which forbid any person to begin to learn the trade before he is 16, or after he is 21 years old. One apprentice is allowed for the first three journeymen employed, and an additional one for 10 additional journeymen. Each journeyman is allowed to take a son desiring to learn the trade as an apprentice.

The apprentice receives \$7 a week during the first year, \$12 the second year, and \$15 during the third year, which completes the apprenticeship. Before entering his apprenticeship the boy signs a contract to serve three years at an agreed wage, the employer agreeing to employ him steadily and to "use all proper endeavor to instruct him to learn the trade."

At present 25 apprentices are registered with the union. If the full quota allowed by the union were employed, more than 200 apprentices would be learning the trade. No system of selecting apprentices is practiced. Sometimes sons of painters are engaged. Occasionally an employer secures an apprentice by advertising.

The trade includes six classes of workmen—apprentices, house painters, wood finishers, paper hangers, interior decorators, and sign painters. The first five represent the stages of advancement sometimes followed. Each line, especially sign painting, has become largely a trade of itself, the workman in many cases becoming a specialist in some one trade. The specialist finds it difficult to remain continually employed in his line; the man with a working knowledge of all branches has many more opportunities to find employment.

THE APPRENTICE.

A boy may be apprenticed to learn any branch of the trade, but by confining his training and experience to one department limits his future opportunities and closes some avenues of promotion. It is possible, however, for the apprentice paper hanger to advance to foreman paper hanger without doing any painting or finishing, but such opportunities are limited. It is also possible to become an interior decorator without having been a paper hanger or house painter, but the interior decorator finds the latter experience much to his advantage.

If the ambitious young man, whether apprenticed to learn wood finishing, house painting, wall papering, or interior decorating, learns all branches of the trade thoroughly, his chances for advancement to foremanship will be multiplied and his employment much more steady. It is customary for house-painting firms to do wall papering and interior decorating and wall-papering firms to do house painting and interior decorating; therefore, a foreman in such an establishment must know all the lines of work carried on. He should early take training in art and design and continue it through-

out his career as an apprentice and journeyman. His value and his wages will depend greatly upon his taste and intelligence.

The apprentice of a house painter usually spends some time in the shop cleaning paint cans and brushes, and then works at sandpapering or removing old paint on some building. After a short time he is allowed to put on the priming coat until he can handle the brush skillfully. In time he is allowed to apply the second coat and take part in the entire job of house painting. The journeyman gives him some instruction in the mixing of paint; but, as a rule, the apprentice simply does the stirring and straining. If he is observing and persistent, he may find out what is put in the mixture and why.

To become competent he must learn the kinds and grades of brushes and their use, treatment and care. He must learn the composition and properties of the various materials used, how to test pigments, oil, and driers, and the effects of heat, moisture, and acid on paints and colors. He must be able to name and recognize tints, shades, and colors, have a knowledge of color harmony and contrast, and be able to analyze a color in order to mix a paint that will match it when dry. He must know how to prepare plaster, brick, wood, and metal surfaces for painting, patch, size, and prime a surface, finish a surface flat or glossy, stipple and smalt, and apply and finish enamel. There are so few opportunities in the trade to acquire this skill and information that the apprentice usually learns to do only one thing, and is kept at that.

For his own safety he must learn to construct and test a scaffold before working on it, to work on a ladder without becoming dizzy, and so to adjust his weight that he can cover the largest surface possible without moving the ladder. He must learn to swing a scaffold from the top of a high building and to lower it evenly and surely. Knowledge of paints, colors, surfaces, and scaffolds is essential in all other lines of the painting trade, especially sign painting. While sign painting is not a building trade, it is mentioned in this connection on account of its close relationship to other lines.

The apprentice paper hanger usually begins by working in the shop, cleaning brushes and paste cans. After a few weeks he is set to work scraping off old paper and washing walls, filling cracks with plaster, and cleaning up after the journeymen. Then he is allowed to apply the paste to paper, trim edges, and eventually experiment in hanging paper on the wall. The apprentice wood finisher is put at cleaning and sandpapering wood surfaces, then at puttying and filling cracks, and in time is taught to apply filler and rub it in, and apply stains, shellac, wax, and varnish.

The apprentice in a general painting and decorating shop may learn, during his apprenticeship, something of all these branches. It will be to his advantage to learn as much as possible of all.

The apprentice should not be above the average weight, as he must be able to get about on ladders and scaffolds. He should have sound lungs to endure the fumes, flexible hands, arms, and wrists, and keen sight to distinguish colors. To advance, he must have a good common-school education, considerable patience and endurance, an accurate sense of color, and some artistic sense. To an ambitious young man, willing to study and improve, the trade offers an attractive future, but to the person mentally or physically lazy the trade offers little more than a bare living.

THE HOUSE PAINTER.

There are between 1,100 and 1,200 house painters in the city. The typical house painter is between 21 and 55 years old. He works eight hours a day, usually at 50 cents an hour. He prepares outside surfaces for paint and applies priming and finishing coats. He must examine new wood surfaces carefully and cover all sappy and knotty places with some preparation to prevent too rapid absorption. He then applies the priming and one or two further coats of paint as required. He usually puts a different color on all wood trim. He must have a thorough knowledge of surfaces and materials, and to advance to foremanship must know the amount and cost of materials necessary to cover surfaces, and the time required.

The most common deficiency of house painters is lack of knowledge of the nature and properties of materials, inability to match colors, and lack of knowledge of other lines which would enable them to find employment when there is no house painting to do.

THE WOOD FINISHER.

A number of wood finishers are constantly employed in the building trades and a large number in furniture factories and cabinet shops, who specialize in this work. Finishers on outside work who are usually able to do painting or wall papering receive 50 to 55 cents an hour. Specialists in this work in factories and cabinet shops receive 25 to 35 cents an hour.

The wood surface is first prepared for the finish, then the pores of the wood are filled with a prepared filler or shellac, and stain, shellac, or varnish is applied. A coat of wax is often applied after the shellac, and the surface, whether waxed or varnished, is rubbed to a polish. On fine woodwork the finish called "French polish" is often given, which requires considerable skill. In rubbing down, the varnish is first rubbed with pumice stone and later with rotten stone and oil.

The wood finisher must know thoroughly the chemical properties of the materials he uses and the nature of the wood to be finished. Different woods require different treatment, and the same materials

applied to different woods will often produce a different color and finish.

It is practically impossible for the wood finisher to acquire all the knowledge necessary for efficient work in the regular routine of the shop. Some outside agency must supply the opportunity.

THE PAPER HANGER.

There are approximately 400 paper hangers in the city, of whom some are transients. They have a separate organization, numbering approximately 200. The demand for paper hangers has increased greatly within the last few years, caused by the tendency of apartment houses and hotels to use wall paper instead of paint. The demand being for plain paper, with small borders and panels, considerable skill is required.

As wall papering does not require much strength, a man can continue at this work until he reaches 60 or 65. While some piecework is done, the union scale is 55 cents an hour, with an eight-hour day.

The work consists of preparing new and old walls, cutting paper to the proper length, trimming off blank margins with a knife and straight edge, applying paste, placing on the wall smoothly and rubbing out all air bubbles with a dry brush and roller. On old walls the paper must be scraped off, cracks and depressions filled and smoothed with plaster of Paris, angles pointed up, and the walls sanded smooth. New walls must be sized with thin liquid glue. The workman must understand the making and testing of paste and its proper consistency for different papers. He must be able to cut the paper to edge and match it properly. Panel work must be laid out with some taste and all edges colored so that seams will not show. A room may be made to appear large or small with the use of proper patterns and ceilings made to seem high or low by the placing of moldings and borders. It is essential to understand these relations.

THE INTERIOR DECORATOR.

Interior decoration has of late years taken on the nature of a profession rather than a trade, a change caused by the high degree of skill, taste, and technical information which is required of the expert. Between 90 and 100 men devote their entire time to interior decoration in Minneapolis. The interior decorator occupies the highest position in the building trades, receiving from 60 to 90 cents an hour for eight hours' work.

The value and efficiency of the interior decorator lies more in his artistic sense and ability than in skill in the use of brush and paint materials, though the latter is very essential.

He must have a thorough knowledge of color harmony and contrast, be able to read and analyze colors, and mix a color with water,

acid, distemper, dye, or oil. He is often called upon to reproduce a picture on a wall, requiring ability to draw and then paint it in the colors desired. He is required to stencil various figures and must draw the design first on the paper and then cut out the parts which are to appear in color on the wall.

Interior decorators state that evening courses in drawing and applied design, color analysis, harmony and contrast, the designing of borders, panels, and so forth will be of great value.

SUMMARY OF THE SURVEY STUDY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

During the progress of the survey, conferences were held between employers and employees in the painting and decorating trade and plans considered for training apprentices in evening and dull-season classes. As a result of these conferences employers and employees have approved of a scheme for training apprentices, which provides that an advisory committee shall be appointed, consisting of employers and employees, to assist the Dunwoody Institute in standardizing the work of the institute relating to the painting trades.

Under the terms of this plan, the union is to require all apprentices during the entire three years of their apprenticeship to attend at least five days a week in January and February an all-day school at the Dunwoody Institute, which classes shall be open to all apprentices in the painting trade in Minneapolis. Half the time spent by the apprentice in the school shall be given to the practical work of painting and decorating, and half to technical and academic work. The employers have agreed to pay the apprentice attending this dull-season school half his usual wages while attending school through the dull season.

The survey committee approves the above plan and recommends the establishment of the following evening classes:

House painter: Classes in color mixing and color harmony, conducted in connection with the courses in interior decoration, in which the more ambitious inside painters would obtain profitable instruction.

Wood finishers: Courses of instruction in methods of advanced wood finishing operated in conjunction with classes in interior decoration.

Paper hangers: Courses of instruction dealing with fine and special papers operated in connection with the classes for interior decorators.

Interior decorators: Evening classes centering the instruction around practical work on the plastered wall and involving lining, use of pounce and stencil, and the study of special methods of decoration, such as bronzing and plaster work, which afford opportunities for instruction in design of borders, panels, and surface ornament, and in color combinations.

PLASTERERS.

The growing use of cement, plaster, and stucco as outside finish for buildings, together with the large amount of building due to growing population, has called for more plasterers in the city. About 500 men are now engaged in the trade in Minneapolis, an increase of 28 per cent over the number in 1909.

For plain plastering the supply of men is recruited largely from nonresidents or "floaters," but the number who can do ornamental plastering is quite limited. Almost all modeling and casting is done by men who learn their trade in Europe, particularly in Germany and Italy. There is little physical or nervous strain on plasterers but, except for casters and modelers, the nature of the work requires that the man be able-bodied and have considerable endurance.

The busy season is from April to October. January and February are practically idle, though inside work sometimes furnishes employment. Journeyman plasterers work eight hours a day at 70 cents an hour. About 65 per cent belong to the union, plasterers' tenders and modelers and casters having separate organizations.

As has been stated, the demand for skilled men is constantly increasing with, as yet, no adequate provision for training men to meet this demand. There is a crude apprenticeship system, the training consisting of that which can be picked up in working on the job. Under these conditions men from smaller communities could come to Minneapolis and, because of their experience in plain plastering, get admitted to the union, and it has been impossible to maintain any set standard of efficiency for journeymanship. Apprentices are expected to serve four years and admission to the union has been based more upon the time served by the apprentice than upon his proficiency as a plasterer.

The classes of workmen are: Tenders, apprentices, and journeymen plasterers who are engaged in or on buildings, and casters, modelers, model makers, and case makers, who as a rule work in shops making material to be later installed in buildings much as mill-work is made and installed, and are not supposed to do any work or to erect work on buildings.

THE TENDER.

The tender does about the same work as a common laborer, including the heavy work of mixing the plaster, carrying it to the workman, and building scaffolds. As one tender is usually required for every journeyman, there are approximately 220 in the city. The tender must know how to mix plaster containing the right proportions of materials and of the proper consistency. He must be able to carry a hod, climb ladders and scaffolds, and capable of doing heavy work. Tenders are from 21 to 60 years of age, and, for the

most part, have little education or training. Inability to read or write is no handicap for the work, as they are never called upon to follow written directions or specifications, but the work requires considerable knowledge of materials and the kind and consistency of mixtures for different jobs. Skill consists largely in handling the hoe and hod. Tenders are not allowed to handle a trowel or other plasterer's tools.

For his work the tender receives 45 cents an hour, eight hours a day. Employers feel that provision should be made for giving the tender some knowledge of plaster and its uses before allowing him to draw full pay for this work. At present no provision is made for teaching the tender; he merely goes to work, picks up what knowledge he can, and from pointers and complaints made by the workmen is expected to acquire the necessary knowledge.

THE APPRENTICE.

At present 19 apprentices are registered with the union, who, with a few others, make the total about 25. The only system of training young men for the trade is that prescribed by the union under its rules. One apprentice is allowed to each contracting plasterer. The term of apprenticeship is four years. The wage rate in the first six months is \$1 a day; in the second six months, \$1.50; in the second year, \$2; in the third year, \$3; and in the fourth, \$4. Apprentices are usually sons or near relatives of journeymen. No systematic arrangement has been made for employing or testing out the young man desiring to enter the trade; the employer desiring an apprentice engages him. He must be between 16 and 20 years old and be able-bodied and of good health. To become a common plasterer he does not need considerable education; but to rise above the average and be an expert should have at least a common-school education, and a high school education would be a distinct asset.

The usual custom is for the apprentice to go to work with a journeyman, who gives him a few instructions. He is allowed to use all the tools of the trade and work on any kind of work the journeyman is doing. The amount of instruction he receives depends on the disposition and time of his fellow workmen.

To become an efficient workman he must learn the composition of different mixtures, such as first, second, and third coat, and of cement mixtures for outside work. He must become expert in handling trowel and hawk in applying plaster. He should also learn how to cut templates or models, run moldings and cornices, and put ornamental casts in place, pointing them up neatly and accurately.

The most common deficiency of apprentices is lack of fundamental training in the finer points of the trade and inability to make mold-

ings and miters and keep all work flat and true. While many are careless and indifferent, these deficiencies are largely due to the absence of opportunity for training.

THE JOURNEYMAN PLASTERER.

At present approximately 220 journeyman plasterers are employed in Minneapolis. To meet the demand the trade must take on 20 or 25 each year. As the number of apprentices is not sufficient to meet this demand, journeymen are recruited to some extent from other places. They are usually between 21 and 60 years old and the wage rate is 70 cents an hour for an eight-hour day.

The work consists of plastering walls, ceilings, and other surfaces by the use of the trowel, hawk, and other tools, also ornamental work such as cornices and moldings with stucco, cement, and other materials. "Three coat" work is generally done upon flat surfaces. The first coat, consisting of plaster containing hair, is well scratched and made flat; the second, which is like the first except that it contains no hair, is put on and floated; the third, or finishing, coat, consisting of lime and plaster of Paris, is very thin and the surface is smoothly finished.

As considerable stooping, reaching, and working on scaffolds is required, the workman must be able-bodied and have considerable endurance. While common plastering does not require more than average intelligence, the better class of work, such as making moldings, cornices, and ornamental ceilings, requires that the man understand how to read drawings, lay out work accurately, and cut and use templates. In making moldings or cornices the workman cuts a piece of metal to the outline of the mold or cornice. This is mounted in a rude frame called a "horse"; by pushing this template along the wall in a straight line the molding or cornice is formed. The running of this mold into the corners and making a neat miter requires considerable skill and accuracy.

To advance to the position of foreman the journeyman must have other qualifications, which will be described under "Foreman."

The most common deficiencies of journeymen are lack of exactness, inability to read plans and specifications, and lack of skill in doing the more intricate work. Workmen are often accused of indifference to the finer points of the trade, but there is at present no provision whereby they may learn how to do this work skillfully.

THE FOREMAN.

The foreman is generally a journeyman, promoted because of his knowledge and skill and his ability to manage men and plan their work successfully. As he is responsible for its proper performance, he must be able to lay out all the work and show the workmen how to do it. He, therefore, must have complete knowledge of the work

of journeyman and tender and be able to read and interpret plans and specifications. While most of the men engaged as foremen have only elementary schooling, a high school education would be of advantage. In laying out work a practical knowledge of geometry and in mixing plasters some knowledge of the chemistry of the materials is essential. The setting of plaster can be hastened or retarded by mixing sugar, salt, and other substances in the plaster. Often a mixture will require a hard, nonabsorbent surface and the foreman must understand how to obtain this finish.

The ornamental plasterer is dealt with in the chapter on the place of art in industry.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

The foregoing account of the organization of the plasterer's trade and of the knowledge required by the trade has been obtained from the employers and employees in the trade in Minneapolis. Employers and employees agree that the trade is greatly in need of some provision for the training of both apprentices and journeymen. In conference with employers and employees, the following plan was formulated and subscribed to by contracting plasterers and the Plasterers' Union: Free evening classes for apprentices and journeymen plasterers should be conducted in the Dunwoody Institute; in addition, both contractors and the union agree to require all apprentices during the first three years of their apprenticeship to attend at least five days a week in January and February an all-day school, if established, at the Dunwoody Institute; during these months, the contractor is to pay the apprentice half his usual wage while in attendance at the school. A type of this agreement is given in Chapter XXIII (see p. 529).

The survey committee approves the establishment of the dull-season school and is of the opinion that there may be some small possibilities in the way of evening classes for journeymen plasterers, although it should be pointed out that the total number in the city is very small. It is believed that the only evening classes that would attract such men would be classes dealing with the laying out of advanced work, such as the more complex moldings and cornices, polygons, ellipses and arches, and that these would appeal only to men of superior ambition desiring advancement to foremanship positions.

PLUMBERS AND GAS FITTERS.

In the last few years increased attention to sanitation, with the growth of the city, has given increased importance to the plumbing trade. About 500 men are now employed at this work. The work

of the plumber, steam fitter, and gas fitter, though different, is often done by the same shop, as the same tools and many of the same materials are used by all three.

Gas fitting consists of cutting, fitting, and installing iron pipe to conduct gas to heating and lighting fixtures or appliances.

Plumbing work consists of laying water and sewer pipes from the street to houses; installing in buildings and residences plumbing fixtures and other appurtenances, such as filters, meters, tanks, bath tubs, showers, wash basins, sinks, water-closets, and urinals; installing fixtures and pipes for sewerage and drainage.

Liability to injury is small, as is evidenced by the rates charged by casualty companies to employers for protection against accidents to plumbers, the rates being less than for machinists, steam fitters, carpenters, outside painters, bricklayers, and workers on the outside of buildings, and the same as for painters and electricians on the inside of buildings. Plumbers feel, however, that contact with insanitary conditions often causes ill-health.

Plumbers work eight hours a day at ~~from \$5 to \$5.50 a day~~. In January, February, and the first part of March, and for about six weeks during the harvest season they have little work to do. The demand for plumbing work is fairly constant the rest of the year.

The trade in Minneapolis is about 50 per cent organized and contains both journeymen and junior plumbers. Although the demand for plumbers has been increasing, the supply is adequate to meet this need. There is, nevertheless, a great demand for experts competent to plan and install sanitary plumbing. As there has been no opportunity for plumbers to receive instruction in the theory and practice of hydraulics and sanitation, the trade has deteriorated and planning is now done largely by sanitary engineers and architects trained in technical schools. If this continues, the trade will take on more and more the nature of semiskilled labor with a trained technical engineer to plan and direct. On the other hand, the skilled mechanic who understands the practical work and the theory of hydraulics and sanitation is more to be desired than the technical graduate with no skill.

The new workers in the trade are largely apprentices and a few transients from other parts of the country. At present there is no systematic method of selecting or employing apprentices. Plumbers do not, as a rule, urge their sons to enter the trade, as they do not feel that opportunities for training and promotions are sufficiently attractive.

Four classes or grades of men are employed: Laborers, apprentices, junior plumbers, and journeymen, the last three in the order of promotion. A laborer sometimes becomes an apprentice and eventually a journeyman, although such instances are rare.

THE LABORER.

The usual ratio is one laborer to two journeymen, and there are approximately 90 plumbers' laborers in the city. The laborers are often "floaters," but there are 15 or 20 who remain constantly in the trade. Their ages are between 18 and 50 and their wage rate \$1.75 to \$3 a day.

The laborer digs ditches, puts in sewer pipe, runs the water main from the street to the house, and puts on a shut-off valve. The work requires physical strength and sufficient intelligence to do the work correctly. The laborer can do all the work without a great amount of education. He seldom has written or printed directions to read and has no calculations to make. He must be able to cut and thread pipe and use a pipe wrench.

If the workman is to remain a laborer, he does not require any schooling or training, but if he is to become an apprentice or a journeyman, he must acquire knowledge and skill required for that work.

THE APPRENTICE.

There are in the city about 150 apprentices in the plumbing trade. Of these 100 are registered with the union and about 50 employed in nonunion shops. There is no strict regulation concerning age, but apprentices are usually between 17 and 25 years old. There is no rule governing wages and the rate is \$5 a week to \$2 a day. Length of apprenticeship depends on the ability and progress of the apprentice. When he passes the city examination, he becomes a junior plumber and is accepted by the union. No system of indenture is generally practiced, the boy merely going to work with the employer and becoming a journeyman when he can qualify.

The apprentice is usually put to work at things he can do, such as waiting on the journeyman and bringing him tools and materials, and as occasion offers is allowed to do the same work as the journeyman. He receives no training except what the journeyman gives him. As the journeyman is not always familiar with technical points, and feels no responsibility for the apprentice, the latter often gets an inaccurate idea of the trade and its requirements.

The work requires average strength, intelligence, and, under present conditions, ability to learn without a teacher. To advance, the apprentice should have a common-school and, better still, a high school education. He must learn the use of all the tools of the trade, how to make joints in all kinds of pipe, especially to wipe a joint in lead pipe, the proper proportions of lead and tin in solder, how to clean and restore spoiled solder and how to bend lead pipe without kinking it, and how to construct traps of various kinds. He must be able to test drainage systems with water, air, smoke, or chemicals,

have considerable knowledge of physics, especially the effect of heat and cold on lead, tin, brass, and iron, and understand the water hammer, pumps, siphons, traps, and such parts of chemistry as deal with lead, tin, brass, red lead, white lead, litharge, cements, fluxes, sewer gas, septic tanks, water contamination, and electrolysis. He must also learn to read working drawings, be able to make layouts of complete plumbing and drainage systems and install them. He must understand different types of plumbing fixtures and how to connect them, and be thoroughly familiar with regulations concerning traps and vents.

It is impossible, under present conditions, to gain this knowledge while working at the job. Some outside agency must supply instruction. The trade advocates all-day classes in theory and practice of plumbing during the slack months of January and February.

THE JUNIOR PLUMBERS.

The junior plumber is half way between the apprentice and journeyman. He is, in reality, an apprentice who has acquired sufficient knowledge to pass the city examination. He is legally permitted to do plumbing work; but, as he can not market his services at full journeyman pay, the union accepts him as a junior plumber, and allows him to work at a lower rate than the journeyman. His greatest need is skill and technical training, especially the latter. The manipulative skill required of the plumber is not extensive; what he needs is scientific knowledge of hydraulics and sanitation as applied to buildings. Courses in evening or all-day dull-season schools would furnish him the opportunity to acquire the necessary technical knowledge for journeymanship.

THE JOURNEYMAN.

Approximately 200 journeyman plumbers are employed in the city. They are between 21 and 60 years old, and their wage rate is \$5 to \$5.50 for eight hours' work.

As has been stated, the journeyman installs all the plumbing in residences and other buildings, and it is evident that he should understand all the processes of installation and the theory underlying sanitary plumbing and drainage. If he lacks this knowledge and ability, his work must be planned by some other person. To protect the community from the effects of insanitary plumbing and drainage, the city has had to establish rules and regulations concerning such installation and the qualifications of men who do it. To the competent plumber these rules and regulations are no hindrance whatever; they serve, however, to check the incompetent one or the contractor who would disregard them to add to his profits.

If the industry is to become the scientific agency for promoting health, which it should be, plumbers must have opportunity to in-

crease their skill and acquire a scientific understanding of the principles underlying sanitation in cities. The advancement of the trade depends more upon this than upon skill in the manipulation of tools, although this is essential.

The trade is in favor of evening classes for instruction in such subjects as computing contents of tanks and cisterns of various shapes and sizes and the capacity of pipes and boilers; plan reading and estimating of materials; drawing details of valves, traps, sections of bath tubs, sinks, and lavatories; chemistry, including action of hot water, acids, and various materials used in plumbing; electrolysis; septic tanks and disposition of sewage, and plumbers' laws and ordinances.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

The industry in Minneapolis is fully aware of its shortcomings and recognizes the fact that instruction in the theory and practice of the trade is its greatest need. Accordingly, an arrangement has been made with employers, the Dunwoody Institute, and the trade whereby free evening classes in plumbing at the Dunwoody Institute will be open to apprentices and journeyman plumbers.

The survey committee approves such evening classes for journeyman plumbers centering upon practical work in joint wiping and erection of typical fixtures for hot water, drainage, and ventilating systems, together with instruction in the scientific principles underlying the operation of such systems and in city laws and ordinances relating to plumbing work. A certain amount of drawing, such as is used by plumbers, could be introduced in such courses by filling out prepared blue or white prints of floor plans, with plumbing lines and fixture installations, together with the necessary calculations. Opportunity should be given for journeymen to attend general classes in plan reading and estimating and specification writing for the building trades.

These courses afford opportunities for preparation for the examinations required for the license for master plumbers.

Previous to the formulation of this report the employers and the union agreed to require all apprentices during the entire three years of their apprenticeship to attend at least five days a week during January and February an all-day school at the Dunwoody Institute. The contractors will pay the apprentice during his attendance at this dull-season school one-half of his usual wage. An advisory committee from the trade will assist the school in standardizing its work and keeping it in close contact with the trade. A type of this agreement is given in Chapter XXIII (see p. 529).

SHEET-METAL WORKERS.

This discussion treats only of sheet-metal workers in the building trades and men who make metal appliances for buildings and put them in place, and does not include those making sheet-metal appliances in factories and shops. The secretary of the Builders' Exchange estimates that there are 430 men in sheet-metal work on buildings in the city. The United States Census shows 382 tinsmiths in 1910. The large increase in the number of sheet-metal workers since 1909 has been due largely to the growth of the city.

Casualty companies rate sheet-metal work on buildings as more precarious than the work of painters, carpenters, steam fitters, plumbers, or electricians. Only two classes in the building trades are rated higher—structural-iron workers and electricians working outside. Employers feel, however, that the rating is too high, and not proportionate to the number of accidents which occur. Employers and employees agree that the noise of making sheet-metal products causes partial deafness, and employees feel that fumes from acid on the metal used in soldering cause headaches and nervousness.

Eight hours constitutes a day's work, and ~~journeymen receive 50 cents an hour.~~ The busiest season is from August 1 to December 1, with very little work done in February, March, and April.

Of the 300 journeymen employed in the trade, the union holds that 55 per cent are members of their organization. It states that a man is at his best between the ages of 25 and 55; but that occasionally men work at the trade until 65.

The supply of workers seems to keep pace with the increasing demands, but employers state that there is always a demand for men capable of doing the better work of the trade.

The apprenticeship system is peculiar. Each shop employs a number of helpers, and from those who have worked at the trade for at least three years the union selects the most promising and accepts them as apprentices. At the close of one year the apprentice is admitted to the union as a journeyman. In shops where union rules are not observed, boys are engaged as helpers and as they gain knowledge and experience their wages are advanced until they receive the same as journeymen. The union admits only 10 apprentices and when they become journeymen new apprentices are admitted. The union, however, often takes in men who have not served apprenticeships, in order to protect their interests.

From three to four years are required to learn the trade. Helpers receive 25 to 30 cents and apprentices 30 to 35 cents an hour. No contract or indenture is signed in these cases. The survey has not found one indentured apprentice in the trade.

THE HELPER.

The helper waits on the journeyman, carrying his tools and material and doing other unskilled work. The union rules require journeymen to do all they can to teach apprentices the trade, but recognize as apprentices only those admitted to the union.

The helper and apprentice must be fairly able-bodied, but not too heavy, as they have to climb ladders and get about over roofs. They should be keen, alert, and able to learn quickly. To understand the mathematics of the trade, they should have at least an eighth-grade education and a high school education would be of advantage. Journeymanship and the better positions of the trade require a knowledge of the composition of the various materials used, such as tin, copper, sheet steel, sheet iron, galvanized iron, solder, fluxes, and rivets; expertness in handling hand and machine tools used in cutting, bending, turning edges, and riveting; and proficiency in laying out and drafting patterns of pipes, elbows, and tanks.

The mechanical skill necessary can be gained in the shop and on the job, but technical knowledge necessary to read plans, draft patterns, and estimate quantities of materials can not be learned without outside assistance.

The common deficiencies of helpers and apprentices are lack of technical knowledge and of appreciation of mechanical perfection.

Helpers are usually selected indiscriminately from applicants. No tests are given and usually, upon the satisfactory answering of a few questions, the boy is put to work.

As advancement depends more upon knowledge of pattern drafting, plan reading and estimating, and the proper use of sheet metal than upon mechanical skill in manipulating tools, it is obvious that day or evening classes giving technical instruction would materially assist helpers and apprentices.

THE JOURNEYMAN.

The work of the journeyman sheet-metal worker consists in laying out, forming, and assembling sheet-metal utensils; making and erecting water spouts, valleys, and gutters; roofing buildings; attaching metal to ceiling and side walls; making and erecting cornice work, crestings, hollow circular moldings, metal sash frames, skylights, and the covering of fire doors and windows; erecting hot-air furnaces, together with sheet-metal casings, smoke pipes, hot and cold air pipes; making water tanks of various shapes and sizes.

He must have the physical and mental qualities mentioned for the apprentice, but considerable more technical knowledge. He must be able to draw patterns, determine capacities of hot and cold air pipes, square and circular pipes, and of water tanks of various sizes

and shapes, and know the proper methods of joining sheet metal and the action of water and air upon it.

The most common deficiency of the journeyman is lack of knowledge of how to draft patterns, read blue prints, and interpret specifications. To keep up with changing conditions, he must be constantly on the alert to learn and take up new methods. The journeymen feel that they could be benefited by evening classes giving instruction in mathematics, especially the reading of formulas, plane geometry, plan reading and estimating, free-hand and mechanical drawing, and heating and ventilating.

THE FOREMAN.

The foreman is usually the most competent journeyman in the shop. His wage rate is from 50 cents to \$1 a day more than that of other journeymen. His duty is to plan and lay out work for those under him. He must be able, therefore, to read blue prints and draw off quantities of material from them; plan a complete hot-air heating plant, determining proper sizes of all pipes necessary to heat the building, and plan the water spouts, gutters, etc., for a house.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

While the survey was in progress, arrangements were made to establish evening classes at the Dunwoody Institute in sheet-metal drafting, covering practical problems of laying out for cornices, decorative details, gutters, piping, and other architectural work. The survey committee believes that such courses will be of value in preparing for supervision or foremen's positions.

STATIONARY ENGINEERS.

In the study of the hoisting engineer the work of stationary engineer was also studied, as both require the same types of license.

It is difficult to ascertain the number of stationary engineers in Minneapolis because of the number and variety of places where they are employed. These places include hotels, apartment houses, manufacturing establishments, hospitals, schools, public buildings, fire departments, and all places requiring steam engines for operating machinery, fans, electric generators, etc. Every person operating such an engine or in charge of a high-pressure boiler is required to have a stationary engineer's license issued by the State boiler inspector, and valid for two years. In 1914, 1,795 stationary engineers' licenses were issued in Hennepin County. It is estimated that about 3,500 stationary engineers are employed in the county at present, a large majority of these in Minneapolis.

Engineers' licenses are of four kinds; special, second-class, first-class, and chief engineers, according to sequence.

The chief engineer's work varies with the size and character of the plant. In small establishments he is often fireman and engineer and sometimes does sweeping or cleaning. In larger plants the engineer operates the engine and supervises the firing. In very large plants the chief engineer supervises all engineers and firemen. In any case some engineer is responsible for the care of the boilers and their accessories, and must see that the engine is lubricated and always in working condition.

To do efficient work the engineer must understand the care of steam boilers and the conditions affecting them, and know how to test a boiler and care for the fire so as to prevent smoke, and for the boiler so that there will be a minimum of incrustation and corrosion. He must understand the operating of safety valves, injectors, and feed pumps; be familiar with the use of steam indicators and the method of measuring the horsepower of engines; and know the conditions affecting the economic performance of steam engines, such as feed-water consumption, the action of condensers, and the use of reheaters.

This requires a broad knowledge of the theory of boilers and engines as well as of the practical operation of engines and their accessories. This knowledge can not be gained in the routine, and some outside agency must supply instruction.

There is no system of apprenticeship among stationary engineers in Minneapolis nor any plan for systematic training. Often the chief engineer is a graduate of a technical school who has not served an apprenticeship or had practical experience other than in the school. Occasionally a man gets his first experience operating a small engine in a stone quarry or on a pile driver. From this he drifts into engineer's work in some office building and by reading technical books or through a correspondence course learns something of the theory and practice of stationary engine operating. Sometimes he begins as fireman, and by outside study acquires enough knowledge to obtain a special license and in time become an engineer.

The State examines all boilers not inspected by insurance companies to insure their safety and prevent their being operated at too high pressure. The State boiler inspector feels that there is a great need for some system of training among firemen and engineers, as ignorance of the danger often leads a fireman to tamper with a safety valve and overload his boiler.

The pay of engineers is from \$60 to \$300 and of firemen, from \$50 to \$60 a month. Engineers holding special licenses receive from \$65 to \$75, and other engineers from this up to \$300 a month for chief engineers. The average pay for stationary engineers in Min-

neapolis is approximately \$75 a month. The number drawing \$200 to \$300 is small.

SUMMARY OF THE SURVEY STUDY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

Stationary engineers in the city feel that evening classes giving instruction in advanced valve setting, in the use of formulas sufficient to enable the student to understand engineer's handbooks, in care and efficient operation of steam boilers, methods of firing to prevent smoke, prevention of incrustation and corrosion in boilers, principles governing the expansive use of steam, and economic performance of steam engines would be of great value to the engineers employed in the city as regards both wage and advancement.

The survey committee believes that courses consisting partly of classroom instruction and partly of laboratory work can be devised for this class of men, and recommends the establishment of such courses at the Dunwoody Institute.

STEAM FITTERS.

There are 51 steam-fitting shops in Minneapolis, and a large amount of steam fitting is done by plumbing shops. Approximately 375 men are employed in steam fitting. Because of the increase in apartment houses and the tendency to install steam heat in better class residences, the business is constantly increasing. This, together with the growth of the city, places rising importance on the trade.

On account of seasonal fluctuation in the work the supply of labor at some times of the year is much in excess of the demand, while at other times it is necessary to employ men other than journeymen to work as steam fitters in the shops. The business depression in Canada has brought many transient steam fitters to the city.

Steam fitters generally are paid \$5 a day, but in some shops between \$4 and \$5. The working day is eight hours.

The busy season in the steam-fitting trade is from July to January, the installation of new work being done in that period. In January and February considerable repair work is necessary. In April, May, and June the trade is at its worst.

About 80 per cent of the journeymen are members of the union, or about half of the skilled and apprentice workers.

The age of beginners is from 18 to 20 years. As a rule, five years are required to learn the trade.

The steam fitter is at his best when between 21 and 55 years old. There is no regular apprenticeship, but the helper is put to work with journeymen. After working three or four years he may take an examination, on passing which he is admitted to the union.

The work requires men who are able-bodied and able to withstand some exposure. Casualty companies rate steam fitting as less hazardous than carpentry, bricklaying, or sheet-metal work, but more hazardous than iron-foundry work, automobile manufacturing, or woodworking.

Employers say the industry is hampered by lack of knowledge and training of beginners, as there is no apprenticeship system and no special training. As some of the work requires considerable ability and technical knowledge, it is almost impossible to find a man who is competent to do all work required of a steam fitter.

The main work of the steam-fitting shop is to install steam and hot-water heating in new buildings, connect power plants to boilers, repair defective or worn-out plants, and install refrigerating plants. There are four classes of workmen: The laborer, the helper or apprentice, the journeyman steam fitter, and the construction foreman. Only larger shops have a construction foreman. In some cases he is a paid man on a given piece of work, hired by the contracting firm; sometimes his place is taken by the architect of the building. The other three positions are more clearly defined.

THE LABORER.

The laborer does only the rough and heavy work. He helps to set up boilers, cuts up large pipe, carries it to where it is needed, and does other unskilled work. As a rule, one laborer is employed for every two or three journeymen. He must be able-bodied, capable of lifting heavy weights, and ready to obey orders. He may be from 18 to 40 years old, and is paid \$2 to \$2.25 a day, but seldom remains long on a job. He does heavy work, and needs only to understand the orders given him. He has no printed or written instructions and requires no technical knowledge or skill, but quickness to grasp a situation is an advantage.

The most common deficiency of the laborer is his inability to understand and execute the orders given him. A common-school education might be of assistance, but few laborers now are ever promoted to be helpers.

THE HELPER.

The helper acts as a general assistant to the more experienced journeyman, his position corresponding to that of apprentice in other trades. He therefore must learn to handle all the tools of the trade. He is usually a man with a common-school education, who has not had the opportunity to go to high school. His age is between 18 and 30 years, his wage rate \$2.50 a day or less for an eight-hour day. He must be healthy and fairly strong, though his work is not so heavy as that of the laborer. He must be alert, as intelligent as the average carpenter or machinist, and be able to read, write, and

make arithmetical calculations. The farther he has gone in mathematics the better.

Much of the knowledge and nearly all of the skill requisite to a good journeyman steam fitter must be learned by the helper by practical experience, and can not be taught outside. For example, he must be expert in handling all the tools of the trade, such as pipe cutters, taps and dies, and threading machines, but there is much that he will find it difficult or impossible to learn on the job. The finer points of mathematics and the use of formulas must be gained elsewhere. Weights and measures, boiler capacity, high-pressure heating, the properties of superheated steam, pressure reduction, valve and flue construction, heating capacity of radiators, the rate of condensation, blue-print reading, and the construction of thermostats can not be learned in the shop without great effort. At present his only sources of information are technical books and correspondence courses.

The helper is generally selected by personal interview or on recommendation of friends. He is given no special training, but learns as he works. The length of time required to make him an efficient helper varies from one to three or four years. Increase in efficiency brings increase in wage, but there is no rule or custom governing this increase. About 25 new helpers are taken on by the union each year; the same number are promoted or leave the trade. At the end of three to five years the union gives the helper an examination, on passing which he becomes a journeyman. He is required to draw plans of heating plants and tell how to run pipes and do a specified job.

THE JOURNEYMAN.

About 150 journeyman steam fitters are employed in Minneapolis. The journeyman does all and more than the helper does, and must have more thorough and extensive training. He installs heating and refrigerating plants, sets boilers in place, and superintends leveling. He must be able to read blue prints and follow out the plans of the engineer. He takes orders from the supervising architect and must see that they are followed out, after which his responsibility ends. In some cases, however, he is made responsible for the installation with no engineer's instructions to carry out. No man is admitted to the union unless he is thought capable of planning work.

An expert steam fitter should be able to see when repairs are needed in a plant. He should understand different makes of valves and how to handle all the tools of his own trade, together with others used in woodworking, as he cuts all necessary openings in walls and floors. He must know how to grade pipes, put in steam traps and pumps, thermostats and condensers, and repair boilers. He should

know the theories of heat expansion, and the size of the plant required to heat a given space. In short, he should be a thorough mechanic.

The steam fitter usually has at least a common-school education. His age varies from 21 to 60 years, and his wage rate is \$5 to \$7 a day for an eight-hour day, superior ability being recognized by increase in wage or promotion to construction foreman. He must be in good health and fairly strong. In most cases he has been a helper and should have acquired skill by actual work. A graduate of an engineering school with theoretical knowledge sometimes fails because he can not handle the tools.

The greatest deficiency of journeymen is lack of technical knowledge, and this is difficult to acquire while working at the trade. This hampers the industry. A course of systematic instruction in technical phases of the work is, in the opinion of the trade, greatly needed.

THE CONSTRUCTION FOREMAN.

As already stated, the construction foreman is not essential to the shop. He may be appointed by the contracting firm and have no other connection with steam fitters under him. In larger shops he is usually part of the force. The construction foreman plans out the work for the whole shop. He looks over the work, sees what is necessary, and gives instructions to the journeyman. He should have all the technical knowledge of the journeyman and more. Physical qualifications are not important nor is skill in handling tools. He may or may not have been a journeyman steam fitter or a helper. He may be a graduate of an engineering school who has never worked with steam-fitting tools but should have a good technical training.

This position is a promotion for a journeyman, if he can gain it. Ages of construction foremen range from 25 to 60 years, and their wage \$5 to \$7 a day or over for an eight-hour day. They are chosen for ability, increase in which is recognized by increased wage. They are, as a rule, efficient; if not, they lose their jobs.

If the journeyman steam fitter were given a sufficient course in technical and theoretical branches of the trade, there is no reason why, with practical knowledge of his work, he should not be able to do the work of the construction foreman.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

While the survey was in progress, the foregoing analysis of the steam-fitting trade was approved by representative employers and employees in the trade in Minneapolis. Both employers and employees feel that supplementary training is greatly needed, and,

as a result of the survey, they have sanctioned an agreement whereby evening courses are to be offered at the Dunwoody Institute for journeyman steam fitters and helpers.

The union is to require all helpers in the organized shops entering the work after August 1, 1915, to attend for not less than two nights a week for two seasons of not less than seven months each evening classes in steam fitting at the Dunwoody Institute, which are to be open to all helpers from all shops of the city. The employers of both organized and unorganized shops are to give preference in employment of workers to the helpers attending such classes, and in the reduction of their force in dull times are to give the same preference. An advisory committee from the trade is to assist in standardizing the work of these classes.

The survey committee believes that in such evening classes the instruction should center about practical problems and should involve the simple calculations needed. It should bring out the varying requirements involved in piping of water, steam, compressed air and oil systems and should show the construction and operation of different kinds of heating systems, together with the scientific principles which underlie them, including a study of heat radiation. A certain amount of drawing dealing with the laying out of piping systems should be had in such a course.

STONECUTTERS.

There are five stonecutting concerns in Minneapolis who employ practically all the stone and marble cutters in the city. While the industry is an important one, only 30 men are employed as stonecutters.

The work consists of cutting stone to fit various parts of buildings. The marble cutters cut tile for walls, floors, and ceilings, and marble for interior decoration.

The occupation is not particularly hazardous, but the workmen assert that dust from the stone causes "stonecutter's consumption"; that vibration of the automatic hammer causes numbness or paralysis of the hand and wrist, and that the constant noise occasionally causes deafness and affects the nerves. Eight hours is a day's work, with Saturday afternoon off. The marble cutting is fairly regular all year round, depending upon the contracts. The active season is from March to November, the slack season from November to February. Often, however, stonecutters are busy all year.

Of a total of 30 workers 25 are members of the organization. Beginners are between 16 and 18 years old, as a rule, although at present only one apprentice is employed in the city. Four years are required to learn the trade, and the age of maximum productivity is between 20 and 50. Employers say that bad habits do more to limit the productive life of the workman than the work does.

The demand for stonecutting is fairly constant in Minneapolis, and the supply seems adequate. New workers, as a rule, come from outside the city and largely compensate for older employees who drop out. Many of these men are from Europe, and in the marble work most are from Italy.

The union rules provide for one apprentice to every 12 workmen, but no attention is paid to this rule, as apprentices are not being taken on in the city. The one apprentice is being paid as follows: First year, \$1 a day; second year, \$1.50; third year, \$2; and fourth year, \$3. Journeymen are paid \$5 a day for eight hours' work. There are no apprentices in marble cutting, and journeymen receive 35 cents an hour. The employment, however, in marble cutting is much more steady than in stonecutting.

The processes of stonecutting are more and more being performed by machinery. Firms, as a rule, employ draftsmen to make complete drawings of all stones to be cut and patterns for curved work, stone moldings, and cornices. They make metal patterns or templates, with which the cutter measures his work. The cutting is largely done by automatic chisels operated by steam, hydraulic, or electric power. The work requires that the man be able-bodied, as he is often called upon to do handwork and to handle heavy stones.

To be a stonecutter under present conditions does not require high skill or more than average intelligence. To be a first-class mechanic, however, the man must have thorough knowledge of plane, solid and descriptive geometry, and of stereotomy or the art of cutting solid stone to various shapes. He must be able to visualize the stone as it will appear when cut and have a definite plan for cutting this stone from the solid block. This requires ability to interpret working drawings and to measure accurately. To advance to the highest position in his trade, he should have a knowledge of the chemical and geological formation of stone in order to determine the enduring qualities of stonework. He should know something about conventional architectural standards and be a judge of color harmony and proportion in buildings. This technical knowledge can not be learned in the routine, but the actual cutting of the stone can be better learned in the trade than elsewhere.

The most common deficiency found in stonecutters is inability to visualize and lay out the work accurately.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

While the survey was in progress, this statement of the work of the stonecutter was approved by both employers and employees in the stonecutting industry in Minneapolis, and an agreement was

reached whereby the Dunwoody Institute is to provide free evening classes, as outlined, for cutters and apprentices in the hard and soft stone cutting business.

Under the terms of this agreement apprentices are to be required to attend these classes, and the employers have agreed that, other things being equal, preference in the hiring and retention of employees will be given to men attending such evening classes.

The survey committee believes that such courses should provide instruction in the laying out of the more difficult forms met with in stonemasonry, such as arches, spiral stair treads, decorative details, and lettering. The committee also feels that work in modeling would be of value to those who wish to prepare for stone carving.

STRUCTURAL-IRON WORKERS.

A large quantity of structural-iron work is done in Minneapolis. The manufacture of structural and ornamental iron is treated fully in another chapter. This discussion relates to erectors who do heavy structural-iron work on buildings.

There are, approximately, 100 erectors in the city, 95 of whom are members of the union. Not more than 20 erectors are regularly employed in the city, the others being engaged in bridge and other construction work in the territory contiguous to Minneapolis.

The work is unsteady and precarious. The liability to accident is greater and the insurance rates are higher than in any other building trade. The erectors themselves are of the opinion that the noise made when riveting causes nervous strain and deafness to the worker. The employers consulted were not of this opinion.

Eight hours is the usual day's work. Fluctuation in employment is considerable. January and February are the dull months. The wage rate for journeymen erectors is 62½ cents an hour. The new workers come from laborers who learn the work rapidly. They must be men of nerve and agility.

There is a crude system of apprenticeship in the trade. The union allows one apprentice to seven journeymen, but this is far more than the number employed. Apprenticeship lasts 18 months, during which the apprentice learns to "walk iron," become accustomed to the height, and overcome his fear of falling. He carries rivets and bolts and learns all the operations of heating, bucking, and riveting by assisting in this work. At the expiration of his apprenticeship he is given an examination by the union, and on passing becomes a journeyman.

The beginning age is from 21 to 25, and the age of maximum productivity from 21 to 45. Both employers and employees state that the supply of erectors is adequate. The demand is decreasing on account of the use of reinforced concrete, in which the day laborer

has supplanted the erector. While the union has held that laying rods in reinforced concrete is the work of journeyman erectors, no contractor in Minneapolis has recognized the contention.

The work of the structural-iron worker consists of laying out and cutting to proper length angle iron, channel iron, and T-iron beams used in constructing buildings, bridges, and viaducts; erecting and fastening these by bolts, rivets, and plates; laying out and assembling grills and other ornamental work, assembling and erecting fire escapes, vaults for banks, advertising signs, smokestacks, ventilators, and all iron and steel construction work in the building trades.

Except that of foreman, no work in the trade requires particular training. As a rule, the men have more than average strength and are muscular and wiry. Wages of erectors are high largely because of the risk. Both employers and employees agree that good foremen are needed, who should know strength of materials, be able to read plans, have good judgment, and understand the machinery of hoisting loads, weights, pulleys, engine action, and conditions. The foreman is usually the best man in his crew and has some technical knowledge.

Occupations in the work of erecting structural iron includes heater, buckler, riveter, and derrick man. There is no sequence in promotion. The buckler, riveter, and derrick man receive same rate, 62½ cents an hour. Every journeyman is expected to perform all the work of each process and thus be able to relieve others.

There is no systematic method of selection. Erectors are usually men who travel from city to city doing work for big firms, or are selected from strong, robust, and promising men in the city. All they need is to be muscular, of good health, and fairly intelligent. No special knowledge or skill is required except by the foreman. A man can acquire in the routine all that he needs to know. Usually the foreman is somewhat lacking in technical knowledge.

The industry does not seem to be hampered by lack of training or knowledge among beginners. Workers are selected at random and from various sources, usually from casual laborers. They receive no special training and there seems to be no need, except by foremen, for any technical knowledge or manipulative skill before entering. Whatever skill is needed can be gained in the routine. The foreman would be greatly benefited by evening classes where he can learn the reading of plans, strength and weight of materials, loads, weights, pulleys, and hoisting machinery, including engines.

The heater heats the rivets in a forge, usually operated by hand, and tosses them to the man who places them in position. He must know when the rivet is hot enough by sight and be able to throw it

skillfully. He must know different sizes and lengths of rivets by sight in order to supply the other workmen with those of the proper size.

THE BUCKER.

The bucker places the rivet in place and holds a lever or bucking iron against it while the riveter hammers. The bucking iron is a heavy bar of iron with a countersunk end which fits over the head of the rivet. All the bucker needs to know is how to hold this lever properly, and a week is ample time to acquire skill in this.

THE RIVETER.

The riveter forms the head on the protruding end of the hot rivet by means of a special riveting hammer or automatic riveting machine driven by air, hydraulic, steam, or electric power. He needs to know when the rivet is tight. His skill consists in operating the hammer, which he learns in a short time.

THE DERRICK MAN.

The derrick man, who usually comes to his position through the other work of the hoisting crew, is responsible for such work as placing beams and hoisting. He must know how to fasten chains and cables and be a good judge of weights and the strength of all parts of the derrick, and of chains and cables. His skill consists in handling heavy material rapidly. This he learns entirely by experience. A man of average intelligence will acquire the necessary skill in one or two years.

CONCLUSION AND RECOMMENDATION OF THE SURVEY COMMITTEE.

A study of the trade of the structural-iron worker does not warrant the establishment of courses training for the work or extending the knowledge of the technical phases of the work to erectors in Minneapolis.

CHAPTER VII.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR THE ELECTRICAL WORKER?

Discussion of the electrical worker naturally resolves itself into a consideration of (1) the telephone; (2) the electric railway; (3) production of electric heat, power, and light for general use; (4) manufacture of electrical apparatus; (5) installation of switchboard apparatus; (6) the armature winder; and (7) overhead and underground construction. These are treated in the order given.

TELEPHONE INDUSTRY.

Both the Northwestern Telephone Exchange Co., a Bell company, and the Tri-State Telephone & Telegraph Co., sometimes called the independent telephone company, serve Minneapolis and St. Paul. These two companies, whose offices in Minneapolis are also headquarters for the Minnesota, North Dakota, and South Dakota districts, employ about 3,000 men and women.

The telephone property consists of the main central buildings and about a dozen branch exchanges. The central exchanges and all the branches are connected by trunk or cable lines, usually laid in conduits, especially in the down-town districts, while overhead construction is used to a limited extent in outlying districts. Subscribers are connected to branch exchanges by individual or party lines, and these in groups of 25, 50, 100 or more pairs are placed inside a lead cable.

In the exchanges are the switchboards and racks containing relay coils, fuse boxes, and ringers, and in the central exchange are the toll or long-distance boards. Each subscriber's pair of lines must be run to each of 12 to 15 sections of the switchboards, so that his telephone can be reached by any operator. The fact that from 10,000 to 12,000 subscribers are connected with a station gives some idea of the interconnections required. Furthermore, the wiring is made much more intricate by being run through various relay coils.

The apparatus used on switchboards and racks for giving signals to operators and subscribers, such as the busy signal and the out-of-order signal, consists of mechanisms comparable to those in a watch, and the various pieces must be kept accurately adjusted. The

adjustment and proper care of this mechanism and the proper understanding of the functions of each individual part require a high degree of skill and training.

The Tri-State Telephone & Telegraph Co. is installing an automatic system in the Twin Cities, and in a year or so automatic switchboards will have entirely replaced the manual boards now in use. This will practically eliminate all girls now operating the local switchboards, except in the special-service or information department.

The telephone industry is one of the most highly developed in the city in perfection of service and in skill and training required of the worker. Many illustrations like the following could be given: One company has a department whose sole duty is to check the speed with which subscribers are served, and it is not uncommon for an operator to be notified that the preceding month she averaged two seconds below the standard in pulling out plugs or disconnecting parties after the receiver was hung up. A break in a cable nearly 18 miles away was located in the central office by electrical measuring instruments, and was found to be within 7 inches of the designated point.

The telephone business is advancing so rapidly as to require years of training to be able to understand the constantly shifting conditions and the adjustments necessary to meet them. Three years ago a certain type of switchboard, considered a great improvement, was installed by both companies. Now this board is regarded as obsolete. Telephone men agree that from 5 to 10 years of actual experience are required really to learn any branch of the business.

The general organization of a large telephone company includes four departments, all under a general manager. The commercial department, where both men and women are employed, makes out the monthly bills to subscribers, collects accounts, adjusts complaints, looks after legal matters, and handles the general commercial work. In the traffic department, where 99 per cent are girl operators, operation of the switchboard and connections is carried on. The plant department, employing men only, takes care of construction and maintenance. The engineering department gives technical service to the other three departments and plans development and extension of all the work. This report is primarily concerned with the plant and engineering departments.

PLANT DEPARTMENT.

In the plant department of the two companies are about 1,100 employees, of whom 75 per cent should have a good technical knowledge of telephony, either for their present or for more desirable positions. These men, whose ages vary from 18 to 56 years, are em-

ployed in six subdivisions, rated in the order of importance as the facility, maintenance, installation, construction, cable, and clerical divisions.

The facility division employs six to eight men, whose ages range from 30 to 35 years and wages from \$75 to \$175 a month. They must have the experience and ability that can be acquired only after years in the industry. They must understand thoroughly outside plant development work, especially as applied to future growth, as it is their duty to study the growth of additions and new subdivisions and the problems connected with introducing the telephone into these districts. Branch exchanges are often located 15 to 18 years ahead of the development of new territory.

The maintenance division employs 75 to 150 men, whose ages vary from 18 to 36 years and wages from \$35 to \$90 a month. Their duty is to maintain the operating plant in a high state of efficiency. The head officers, whose duties are directive and supervisory, are the district wire chief, assistant district wire chief, and the wire chief of each branch exchange. Under these are the switchboard workmen and apprentices, and outside repair men, who look after the apparatus of the switchboards and workrooms, and repair station apparatus and subscribers' lines. Their service is not so much to correct as to prevent trouble. Often a subscriber's line is repaired without his knowing it. All these men must have a thorough knowledge of telephony, including the elements of electricity and magnetism, electric circuits, functions of intricate pieces of apparatus used in telephony, their construction, and the theory back of them.

The installation division employs from 100 to 160 men, whose ages range from 19 to 56 years and wages from \$1.50 to \$3.50 a day. The foreman draws \$95 to \$125 a month. These workers install the equipment, which may be a single instrument or an entire private switchboard. A knowledge of telephony is required only sufficient to run lines from the "street feeders" to the instruments and properly "connect up" the latter. As so many telephones are taken out, replaced, and installed a year, there is continual change in this part of the telephone property. If there is only one facility installation in every ten, many facilities result in the aggregate. For this reason, although the duties of the installer are comparatively simple, much care is required to insure the best results. This is particularly true during rush seasons.

The construction division has from 125 to 250 men, who are from 25 to 40 years old. Foremen's wages range from \$100 to \$160 a month, the wages of the men they direct from \$2 to \$3.50 a day. All new outside work, such as setting poles and running wires, is done by this division. Only the foreman requires special skill and training, the other workers merely following instructions. As the amount

of employment varies greatly from season to season, extra men are either taken on temporarily from any available source or transferred from some other part of the company's work.

The cable division employs from 40 to 100 men, who are on the average about 40 years old and draw \$1.75 to \$4 a day, foremen receiving from \$100 to \$150 a month. The men splice cables, wipe lead joints, though not so carefully as a plumber, attach cables to supporting wires, and make connections to distributing boxes. Only the foremen must have any considerable training in the science of telephony, while the workers are taken from the old-time linemen or from helpers to the cable men, who in some cases are promoted to be cable men themselves.

The clerical division has from 25 to 40 men and women, from 20 to 30 years of age, and receiving \$40 to \$90 a month. Their duties are to look after business accounting. They should have business training and experience and know the names of different pieces of apparatus, where used, and the cost.

ENGINEERING DEPARTMENT.

This department is usually under the division engineer and its work is done by six groups of expert workers: Outside plant construction engineers, equipment engineers, toll-line construction engineers, traffic engineers, drafting department engineers, and appraisal engineers. From 28 to 35 men are employed who vary in age from 17 to 36 years, and whose salaries range from \$60 to \$150 a month, except draftsmen and clerks, who get \$35 to \$90.

The 10 or 15 outside plant construction engineers design pole, conduit, and cable construction. Four to six equipment engineers prepare specifications for switchboards, substation apparatus, power plants, and buildings. Two or three toll-line construction engineers make specifications for toll-line construction and transferring lines. One or two traffic engineers study population and telephone growth, usually called development work. Four to six draftsmen do architectural, mechanical, and electrical drafting, and several appraisal engineers make physical valuations of sites, buildings, and plants.

In the engineering division, good judgment, accuracy, carefulness, and a serious attitude toward the work are needed. A good education is of value, and a high school course, followed by college training, is highly desirable. All should have considerable knowledge of telephony, acquired by study after long experience in the field, or preferably in the field after a special course in electricity.

The demand for good telephone men is growing daily. In the last five years one of the companies has doubled its number of stations and its force. A special type of man with knowledge of the technique and theory of telephoning is required. This can be acquired only by

private study or in some special school. Both pay and chances of promotion are good. The field of telephone work from every angle seems attractive. All telephone companies are more or less national in organization and practice is well standardized throughout the country. Consequently, a successful telephone man has no trouble in getting employment in almost any locality.

The most common deficiencies of workers are lack of proper training and indifference. The older men who are not "making good" have not had sufficient education or training, and must be content to fill more or less "set" jobs in which they can perform routine work. In cable work or line construction, for example, these men follow certain rules of construction, and the more nearly they follow them the better their work. Younger men not only fail by reading or study to acquire technical and scientific knowledge, but fail even by observation and investigation to learn the practical side. Apprentices work around the switchboard and racks in the rack room, wiping off dust and tightening connections, and entirely neglect this chance to learn the construction, care, and use of the apparatus.

If apprentices and helpers had regular instruction in part-time or evening classes, there is no reason why most of them should not become students of the business and develop into valuable men.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

The suggestions for training embodied in the courses herewith proposed, developed during the progress of the survey, have been approved by representatives of the two telephone companies and concurred in by the survey committee.

For boys who wish to fit themselves to become telephone men a two years' course should be offered. Only those should be admitted to it who have completed the eighth grade at least, as a fair knowledge of common-school subjects is necessary to a proper understanding of electrical and telephone work. The first year should deal with the fundamental conception of the electrical circuit, electrical units, Ohm's law, and its application to series and parallel circuits and line drop, equations in the measurement of power and losses in transmission; construction and troubles and connections of shunt series and compound generators, and the testing of open and short circuits in cables.

In the second year complete outfits of telephone apparatus should be installed, set up and disassembled from time to time. The instruction should cover the laying out of different circuits; construction, operation, and repair of switchboard circuits; relay adjustments, storage battery and power equipment; application to the telephone of magnetism and electricity as presented in the first year; and con-

struction, operation, and repair of transmitters, receivers, condensers, induction coils, ringers, protectors, and switchboards. Near the close of the year the pupils of the telephone course should have actual experience in testing and in clearing trouble on lines and substation, central office, cable, and private branch exchanges.

It was also the opinion of these representatives that persons already employed in the telephone business should have a chance to attend classes two nights a week, two hours a night, for the 50 nights the evening schools are in session. The evening courses of instruction should deal first with the fundamental conception of the electrical circuit, electrical units, Ohm's law, with particular reference to line resistance and line drop and testing of line circuits. These courses should later differentiate according to the needs of different groups of telephone workers, such as central office, cable, private branch exchange, line and substation men, and into special lines of instruction based upon practical applications and commercial operations not met by these men in their daily work.

Here, as in the case of the day-school pupil, the equipment should provide opportunity for demonstration, testing, and, in some cases, for actual construction; and the instruction must be made practical, with constant application of themes and principles to actual work. Where students are deficient in general mathematics they should take the work of the special class for telephone men in this subject. This training should open opportunities for better wage and for advancement to supervisory positions within the facility, maintenance, installation, construction, or cable divisions of the plant department of the telephone business; and for promotion from one division to another, which usually takes place in the order given above.

ELECTRIC RAILWAY INDUSTRY.

The Twin City Rapid Transit Co. operates 437 miles of lines in the Twin Cities, Stillwater, and Lake Minnetonka field, serving a total population of 650,000. About 4,000 persons are employed, all, except a few stenographers and clerks, engaged in operating or construction and repair work, the company maintaining extensive shops to build its own cars. One steam plant and two hydroelectric plants, located at dams on the Mississippi River, furnish electric power, and 18 substations containing rotary converters transfer the high-tension alternating current from the transmission lines and feeders down to 700-volt direct current used on the car motors.

The departments of the company are the legal department; the power, publicity, stores, maintenance-of-way and mechanical departments under the jurisdiction of the vice president; and the schedule, navigation, station, supervision and inspection, switchmen,

trainmen, and passenger departments under the general superintendent. This report deals only with the mechanical, maintenance-of-way, power, switchmen, and trainmen's departments. The last also is known as the transportation department.

MECHANICAL DEPARTMENT.

Under the master mechanic and general foreman in this department 525 workers are employed, as follows: Machine shop, 48; sheet-metal shop, 15; electric repair men, 29; truckmen, 33; general repair men, 14; painters, 60; millroom and woodworking rooms, 109; engineers and cleaners for the lake boats operated by the company, 13; general building construction for the erection and repair of stations, shops, and pavilions, 100; foundry, 24; forge room, 22; structural steel, 13; pipe shop, 13; boiler room, 20. All the figures given are for the largest number employed. These workers are from 18 to 50 years old and get from 75 cents a day for the first two months of apprenticeship to \$4 for experienced workers, the foreman receiving \$85 to \$200 a month. There is a wide variety of employment under the same roof, and skill ranging from that of the inexperienced boy and common laborer to that of the high-grade mechanic.

There is a general apprentice system for each trade, but no papers are signed. Apprentices begin at 75 cents a day for a trial period of two months. If satisfactory, wages are raised to \$1 a day for the next 10 months. The second year \$1.50 is paid, and the third, \$2. Advancement after this depends upon ability and application.

The instruction needed by employees in the machine shop, sheet-metal work, general repair, painting, woodworking, and the construction of buildings would not differ from that required in plants considered in other chapters; consequently only the training needed in electrical work will be stated here.

The greatest deficiency of the men in all lines is their failure to take advantage of opportunities to prepare themselves for advancement. Often this results in bringing in foremen and workers from the outside for the better positions. Most of the workers seem content simply to do the daily task and fail to learn more about their own work and that of others. One great difficulty is that they work 10 hours, and are too tired to take evening school work. Neither officials or men think that part-time or shop classes for mature workers would be feasible or advantageous, but they believe that further training would help the apprentice. However, the courses for all the trades of the shop should be extensively advertised among these men, so that the more ambitious at least may have the chance to attend.

MAINTENANCE-OF-WAY DEPARTMENT.

Under the engineer of maintenance of way are five assistant engineers, all technical graduates; six surveyors who lay out the work; 10 machine men who operate grades, concrete mixers, electric shovels, track-grinding and track-welding machines; and from 100 to 800 men, according to the season, mostly laborers on track construction and repair and street work. Engineers are from 20 to 39 years old and receive \$80 to \$150 a month; surveyors, from 20 to 30 years, and get \$50 to \$80; machine men from 20 to 40 years, and get \$2.25 to \$2.50 a day, and laborers from 20 to 50 years and get \$1.75 to \$2.50 a day. Four general foremen at \$100 to \$150 a month are in charge of track construction and repair work, while a gang boss at \$3.50 a day is used with every gang of 25 or 30 men.

There are three general classes of workmen in the department: Technical graduates, surveyors who might be interested in special courses in advanced surveying or higher mathematics, and the trackmen and machine men. Among the last, the common laborer largely predominates, and neither the pay nor occupation would justify special courses, except for men of superior ability.

POWER DEPARTMENT.

At the head of this department are the engineer of power and his assistant, who have direct charge of the power stations, substations, underground and overhead lines.

In the steam-power station a chief engineer, an assistant engineer, and one night and one day operating engineer direct the work of the boiler-room engineer and his two foremen who look after the water, the foreman of the coal crew, and the foreman of construction work. With the exception of the chief engineer, these men are paid from \$80 to \$125 a month and are from 30 to 45 years old. Practically all are without technical education, but have worked their way up and possess a good practical knowledge of the work.

Under these foremen are about 50 men employed as oilers, firemen, general repair men, boiler setters, cleaners, and repairers, and laborers performing various tasks, whose ages range from 20 to 40 years and wage from 20 cents to 40 cents an hour.

In charge of the two hydroelectric stations and the 13 substations is the chief electrician, with 33 switchboard operators, 13 dynamo tenders, and three general electrical repair men. These men are 21 to 60 years old and draw \$70 to \$120 a month. They start as dynamo tenders or repair men and their wages are increased as they become more efficient.

All the men in all the power stations should be familiar with the construction and operation of electrical machinery, both steam and hydrau-

lic, and should understand the underlying principles of direct and alternating currents, transformer and switchboard operation, and synchronizing machines. Practically all lack technical knowledge of electricity and magnetism as applied to the apparatus in their charge. Evening courses, combined with written work, which could be studied on duty, seem to offer the only chance to reach these men.

In the overhead and underground line work there are 8 to 10 foremen who receive from \$75 to \$100 a month, and 60 to 65 men employed as splicers, bonders, conduit men, helpers, and chauffeurs, who receive from \$2.25 to \$2.50 a day.

TRANSPORTATION DEPARTMENT.

Under the general superintendent and his assistants in this department are between 2,200 and 2,300 men. Last year 971 new men were taken on and 739 dropped, an increase of 232. Each of six car stations is in charge of a day and a night foreman, paid from \$125 to \$150 a month. Under these are 90 men, mostly clerks, at \$80 a month, usually promoted from the position of conductor and expert in checking transfer numbers and conductors' reports. The rest of the station crew are trainmen, usually beginners, who get experience by switching cars in the station shed and getting them ready to go out.

There are seven supervisors, one each for five stations and two in the sixth, who get \$150 a month. In charge of all cars and crews after they leave the stations are 24 inspectors and 5 dispatchers at \$100 a month. Thirty-five old employees, who may be considered on the pension list, clean, grease, and operate the switches at 19 cents an hour. Under a superintendent of schedules, at \$75 to \$80 a month, 15 men are engaged in starting and recording routing lines of cars. In all, 2,128 motormen and conductors operate the cars, of whom half are 23 to 30 years old, and 86 out of 100 between 23 and 40 years. These men come from rural districts. They are paid on a steady scale based on length of service, starting at 23 and rising to 30 cents an hour.

The conductors must be honest, even-tempered, slow to anger, and should be courteous and tactful with the public.

These men need little knowledge of a general kind, but should be familiar with car operation and car construction, with a knowledge of the controller, its construction, operation, and function, and the use of overload or blow-out switch and fuses. The motorman must also have skill in car operation, acquired during his trial period in a station, later on runs with a regular motorman, and finally on a run of his own. These trainmen receive a few weeks' course of instruction before they go on regular runs, and there seems to be no further need for instruction.

SUMMARY OF THE SURVEY STUDY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

In the opinion of the survey committee a general apprentice course for the apprentices in all the different lines in the mechanical department would enable the company to produce both better workers and better foremen for the future. All apprentices need a general training in such matters as shop mathematics, shop drawing, the estimating of quantities and the elements of mechanics and electricity, as directly connected with the work in the shops. This course could best be conducted right in the shops for two or three hour periods.

This department might also absorb yearly a few boys who had received, either in the Dunwoody Institute or in the technical course of the high school, two or four years' instruction in shop mathematics, drawing and blue-print instruction, the elements of mechanics and electricity, and enough machine and wood shop instruction and practice to make them familiar with the machines found in the shops of the company. Boys of superior ability and willingness, who bring to the work such a technical equipment from the school, should find desirable opportunities of advancement in this department.

For the men in the mechanical department looking to advancement in wages, courses should be made available in mechanical drawing, involving shopwork and calculations in electrical trade science, with particular reference to street-car apparatus, such as motors, controllers, fuses, electric air brakes, etc.

In a department employing foremen along so many different lines, who must not only meet common problems in shop organization and management, but cooperate with each in their work to the best advantage, it would seem highly desirable that a foremen's class be held at least once a week by the employing company for the systematic study and discussion of shop problems, and the hiring, retaining, and promotion of workmen.

The fact that these men work 10 hours a day is somewhat unfavorable to attendance in evening classes; hence it would be better to establish classes right in the shop, say, in two or three 1-hour periods a week.

In the maintenance-of-way department opportunity for the attendance of ambitious young men upon evening classes in mechanical drawing should be provided. In the interest of efficiency, instruction in such technical subjects as street paving, track construction, pole line and conduit work, welding, rail connection, and electrolysis, should be provided by the employing industry.

In the power department courses for those aspiring to engineers' positions should be offered in electrical trade science, as suggested, differentiating in the direction of generators, converters, motor con-

struction, arrangement of switchboard and operation of synchronizing apparatus, etc. For the men in this department this instruction could be given in two or three 1-hour periods a week, in the evening for daymen, and in the daytime for nightmen. The work might also be prepared in correspondence form, since the operators could do a great deal of work while right on the job.

The foremen in the overhead and underground line work carry out instructions as laid down in plans and specifications, and men aiming at such positions need first of all the ability to read plans and make estimates. They would also be benefited, particularly as to chances of advancement, by evening classes in electrical science.

In the transportation department the men could advantageously receive instruction in the stations to which they report. The motor-men should receive courses in the construction and operation of motors, controllers, electric air brakes, trolleys, etc., and also some more general work in electricity and magnetism as applied to their work. The conductors might receive instructions in courtesy, handling complaints which come to them concerning their own work or the service in general, the general policy and welfare of the company, and the like. Also instruction might be given as to the layout of the system of lines and streets, as based upon the geography of the Twin Cities. The work could be required of all trainmen during their training period, and also be offered in evening or day classes once or twice a week.

While it is clear that most of the courses suggested for men in the power and transportation departments should be given by the employing company, certain of the more technical courses which offer the greatest chances of conversion into wage assets could best be given in part-time or evening classes at Dunwoody Institute.

PRODUCTION OF ELECTRIC HEAT, POWER, AND LIGHT.

The Minneapolis General Electric Co., which supplies nearly all electric heat and power service other than that manufactured by private concerns for their own use, has three hydroelectric stations, two steam stations, and a direct-current station. In 1914, 110,000,000 kilowatt hours of power were produced, the output having trebled in four years. In addition there are two distributing substations with attendants and nine transfer stations. In all 600 workers are employed, 400 males and 200 females.

The demand for labor is steadily on the increase. Competent men are hard to obtain, as the industry must train its own help entirely by experience. There is no systematic plan of training. New employees enter at 18 entirely untrained; older men are taken on if they have had experience elsewhere. Usually new men come from

Minneapolis and surrounding country, but occasionally from other cities.

The inside work of electricians does not rank as a hazardous occupation, being rated by casualty companies with plumbers and painters as sixteenth among the 19 men's trades studied, only printing making a better showing. Workers are at their best between 25 and 40 years old. There is no labor organization among them. Most of the men work eight hours a day, as departments requiring continuous service work three shifts.

There are five departments in the company—office, manufacturing, meter, sales, and line. The work of the linemen will be considered under "Overhead and underground construction." Only the manufacturing department will be considered here.

MANUFACTURING DEPARTMENT.

Of 54 men in the manufacturing department, 18 are firemen, 5 oilers, 6 watch engineers, 6 assistant operators, 15 operators, and 4 chief operators. The fireman may be promoted to boiler-room foreman or to oiler, oiler to watch engineer, watch engineer to chief engineer, assistant operator to chief operator, while the chief operator may reach chief engineer.

The fireman is from 18 to 40 years old and is paid \$2.25 a day. He attends to fires, removes ashes, cleans the boiler room, and does other work required by the engineer in charge of the plant industry repairs. He should be athletic, able to stand heat, sober, and reliable.

He should have practical knowledge of strength of materials and how to use the steam gauge, water gauge, and all kinds of valves. To judge the condition of a fire requires considerable knowledge of various grades of coal and how to fire each most economically. Practically all the skill lies in judging the condition of the fire and throwing the coal where needed. Skill in repair work is desirable, but not so important. Practically all the knowledge and skill necessary can be acquired in the work, although school instruction would make for more rapid promotion.

The industry is not hampered by lack of knowledge on the part of beginners as firemen, as many can be hired who have had experience on railroad jobs, farms, mills, or construction work. New firemen are selected for previous experience as well as physique. New men are often "broken in" by the boiler-room foreman. Superior ability and efficiency are recognized by increased wage and promotion.

Instruction in combustion of materials and construction of a boiler as to draft, combustion, and water circulation would increase the efficiency of firemen, save fuel, and aid in smoke prevention.

The oiler ranges in age from 21 to 45 years and receives \$2.25 to \$3.25 a day. He cleans and oils machines, clears the engine room, and

does repair work in the engine or pump room. He should be neat in habits, clear-headed, and quick to act in emergencies, as he must be continuously on the lookout for trouble and able to apply the remedy before damage is done.

A practical knowledge of strength of materials, some acquaintance with the machinist's work, and a rudimentary technical knowledge would be valuable to the oiler. The arrangement of the plant and details of procedure in starting and stopping the plant and its various groups of machines must be memorized, so that necessary operations will be understood in case of emergency. Considerable skill is required in starting the machines and cutting them off. Practically all the knowledge and skill are acquired by experience.

Among the deficiencies of oilers are carelessness, clumsiness, untidiness, and talking too much with fellow workers while on duty. New oilers are taken from among firemen or are hired from other steam plants, railroads, and mills. It takes at least a month to become competent and four months to be able to handle the plant.

Preliminary technical training in the theory of the generation of electricity, operation of the switchboard, and causes of and remedies for trouble would be helpful to the oiler, and night school, in the opinion of the trade, offers a valuable opportunity to those already employed.

The watch engineer has charge of the pump room and engine room during the eight-hour shift. He must do the repair maintenance work, such as sanding brushes, turning commutators, repairing pump valves, and packing stuffing boxes, and tend the machinery while in operation. His age ranges from 21 to 65 years, and his pay from \$70 to \$95 a month. To keep the machines in running condition he needs the knowledge of the oiler and must know how to dismantle and reassemble the machinery.

Problems in strength of materials and plant performance as measured by fuel consumption must be solved. The boiler plant is supervised by the watch engineer, who must make all necessary performance reports. The work requires a man thoroughly skilled in handling electrical machinery and generating power.

The most common fault seems to be the inability of the watch engineer to change methods with the progress of the trade. There is no plan of instruction. New workers are obtained by promotion or from other plants by "trial and error." The chief engineer selects men and gives preliminary instructions. Technical knowledge of the theory of generation of electricity, operation of the switchboard, and causes of and remedies for trouble, with a special course in power-plant operation, would be valuable to the watch engineer.

The assistant operator cleans the electric apparatus and the room, operates arc rectifiers and small apparatus, and helps the operator

at the board. He is from 21 to 45 years old, and gets \$50 to \$65 a month. He must understand the electrical layout and connections, and have an elementary knowledge of electricity, an intimate acquaintance with all apparatus in his care, and some skill in handling wiring of all kinds. Practically all this can be acquired on the job, but the industry is hampered by lack of knowledge among beginners.

New workers usually come from wiring firms, smaller plants, and mercantile establishments with their own lighting system. The chief electrician selects them by a verbal examination; they are "broken in" by the operators. Promotion and increased wages come rapidly for superior ability and efficiency. Technical training in switch-board operation and repair, care of electrical apparatus, and safety precautions would be most valuable, in the opinion of the industry, and could be given both before and after entering the industry.

The operator has charge of the electrical side of the generating station during an eight-hour shift. He must watch the variation in load and so adjust the number of machines as to gain the maximum efficiency. He also directs the assistant operator, who assists him at the board. The age ranges from 24 to 45 years and from \$60 to \$90 a month, according to efficiency.

The operator needs the same knowledge of electricity as his assistant, but he must know more about the whole system, as satisfactory operation of the electrical side depends largely upon him. Skill consists in remembering what to do and when to do it. He should be able also to turn out small jobs in the machine shop. The most common deficiency is lack of knowledge in common branches. Operators "fall down" in making reports as to plant performance, particularly in the arithmetical work—a very detrimental thing to the business.

New operators, who are selected from the assistant operators and given preliminary instructions by the chief, require about three months to become thoroughly at home on the job. In the opinion of the industry, technical training in methods of generation, handling electricity, or safety precautions would greatly benefit those intending to enter and those now in the industry.

The chief operator has complete charge of the plant during his eight-hour shift. He must keep the plant going and maintain its efficiency. One wrong order might shut down the entire plant and do thousands of dollars of damage. His age is from 25 to 60 years, his wages \$85 to \$95.

He needs more technical knowledge than all the men under him and at least a common-school education, though more would be highly desirable. He must be able to do anything about the plant, inspect the work, and handle men. Common difficulties are inability

to get the best service from men and lack of clear expression in issuing orders and making reports. Chief operators are always obtained from the ranks of the operators, as they need familiarity with the plant. The technical knowledge just suggested for the operators would also fit the chief operator's case.

SUMMARY OF THE SURVEY STUDY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

The boys who have had the two-year course of study in electrical work at the Dunwoody Institute before entering the production end of the business should find, in the opinion of the officials of the company, ready entrance and rapid promotion in proportion to their energy and ability.

In the opinion of the survey committee evening classes in electrical trade science, as already noted, differentiated in the direction of power-station needs, such as the study of dynamo construction and principles of operation, layout, and operation of switchboard, practical problems of power-plant operation, with particular regard to maintenance of service during varying loads, would give opportunities for those already employed to improve themselves in position and wage return, and would probably attract some of the more ambitious workers.

MANUFACTURE OF ELECTRICAL APPARATUS.

Three establishments, employing about 60 male workers, make telephone and switchboard apparatus. While only a small portion of new apparatus is actually manufactured, all the repair work and all the switchboard work of one telephone company and the construction of numerous local boards for city firms and country towns are done in the city.

There is practically no risk to workers in this work, which is carried on in well-lighted quarters. They work eight hours, are not organized, may enter the industry at any time after 16, and are at their best between 20 and 40 years of age. Rapid progress in telephone apparatus in the last 10 years has increased the demand for skilled workers. Boys between 16 and 18, with an eighth-grade education, are preferred, and new workers are trained in the shops, as this is the only way they can be obtained.

No regular system of apprenticeship is employed, as workers receive increase in pay and promotion as soon as they are fitted. No particular rules are followed in hiring. Young employees are preferred, as they are more easily trained and, in the case of the American Telephone & Telegraph Company, on account of the system of insurance in force. After two years a man receives the benefit of this protection, and at 60 is retired on half his average pay while with the

company, provided he has been in its employ constantly for 20 years prior to retirement.

The largest telephone manufacturing company in the Northwest is organized into three departments—telephone, installation and office. Attention is here given only to the telephone department, which is divided into four branches—miscellaneous repairs, telephone repairs, switchboard repairs, and telephone inspection. The workers in the order of wage and line of promotion are: Wrapper, miscellaneous repair man, telephone repair man, telephone inspection man, switchboard repair man, and switchboard inspector.

The wrapper wraps bundles, puts them in packages, marks with code numbers, checks with the delivery ticket, and draws stock from other departments on shop orders. While only three or four are required in a plant, promotion is rapid, as about 20 are taken on each year, nearly all of whom are promoted into the miscellaneous repairs branch. The wrapper should have good eyesight and be a good penman. Knowledge of reading, writing, and arithmetic, especially fractions and percentage, is necessary. To advance he must have an eighth-grade standing. No skill or technical knowledge are required for the beginner, but both are necessary for promotion, and should be acquired through day classes before coming into the business or through evening classes. The courses suggested for other workers in this line would apply to the wrapper.

The miscellaneous repair man repairs such parts of telephone apparatus as fuses, lightning arresters, ringers, and coils, and adjusts and tests parts. Some coil winding is done when necessary to make over a defective coil. These men, about 15 in number with the largest company, are 18 to 23 years old and receive \$12 to \$16 a week. About 40 per cent of the work is piecework, with no bonus. Promotion, usually to the telephone repair branch, is rapid.

The miscellaneous repair man should have nimble fingers, be quick in his motions, systematic in laying out work, intelligent in following directions, and neat in his work. He should have at least an eighth-grade education, know something about electricity, particularly circuits and Ohm's law, be able to read detail drawings, and know how to adjust apparatus. About six to eight weeks are required to learn to make a quick diagnosis of trouble and to locate and repair it promptly.

At least 95 per cent of new men have been wrappers, others come from the city and surrounding country. The practical worker has about one month's start over a beginner, and knows the names of parts, the location of stock and the system of getting it. The worker needs, in the opinion of the trade, more knowledge of electricity and circuits, blue-print reading, and specifications. Night-school courses

would meet this need, though such information would be more valuable to a worker if acquired before entering the business.

The telephone repair man assembles coils, condensers, transmitters, and receivers and connects them up in the proper order. Nearly all connections are soldered, so it is necessary to know how to handle soldering iron, screw driver, and pliers. Ages are from 19 to 25 years. Ninety per cent of the work is piecework and wages are from \$14 to \$20 a week. No bonus system is used.

Ability to systematize work and some mechanical skill are required, also a good memory, as five or six sets of connections must be kept in mind. At least an eighth-grade education is necessary. The worker must be able to read prints and understand the fundamental principles of alternating and direct current, and the use and adjustment of every part of the telephone. Two to four months are required to become skillful on ordinary straight work, but special apparatus requires longer. Practically everything can be learned on the job except knowledge of alternating and direct currents and circuits.

No special training is given the promoted worker or the beginner, who requires at least six months to learn the work. Nearly all new workers are promoted from the miscellaneous repair branch and need the same training in electricity, telephony, alternating and direct currents and circuits, and plan reading and specifications.

The telephone inspector tests all apparatus for telephone wall set, desk set, intercommunicating sets, giving special attention to appearance of the work. Wages run from 24 to 30 cents an hour. Besides the qualifications of repair men, from whose ranks inspectors are promoted, good judgment is necessary to pass on work quickly. Skill consists principally in quickly locating faults and giving directions for the remedy.

No one without training as a repair man could handle this work. No special training is attempted, and about six months is required to reach efficiency. Systematic instruction in electricity, especially Ohm's law, circuits and the use of testing instruments, and insulating and conducting materials with resistance measurements would help greatly.

The switchboard repair man assembles on the board and makes the proper connections to coils, jacks, drops, and cables. As small parts must be handled, he must have nimble fingers and steady nerves. A color scheme is used in making connections, requiring ability to read colors. Ages are from 24 to 30 years and pay from 28 to 36 cents an hour.

An eighth-grade education is necessary, also knowledge of the apparatus and color scheme, and ability to read prints and trace circuits, both on the print and on the board. The men receive no special training, though some have taken correspondence courses.

Systematic instruction in electrical theory, reading blue prints, and drawing circuit would greatly help.

The switchboard inspector inspects all switchboard apparatus and locates faults in equipment and cable. He must understand iron and wood work, the finishing of materials, and reading blue prints and specifications of all kinds. The pay is 35 to 45 cents an hour and the ages 30 to 32 years.

A certain amount of all-round knowledge is necessary for this man, whose training has been in lower positions. To the experience and knowledge gained in the ranks he should add better technical knowledge, especially along electrical lines.

INSTALLATION OF SWITCHBOARD APPARATUS.

Rapid expansion of the telephone industry has made necessary a large volume of switchboard work, at least 300 workers being employed by a few companies. This work is light, clean, and not dangerous. The usual day's work is eight hours.

As soon as a switchboard is installed in one town, which requires from one to six months or longer, the men are moved and a new job is begun in another. The demand for workers is increasing and the supply of competent ones is inadequate. Practically all the men are trained on the job, but a few come from telephone companies and repair shops. No apprenticeship is required, as workers are promoted when capable of advancement. A permanent record from report cards made out by foremen is kept of each man on every job. This enables the company to check up the foreman, keep track of desirable men, and assign the right men to the different jobs.

The force is divided into five classes: E, the lowest, consists of common laborers, 25 in number; D, the second, do some of the simple work and number about 200; C, the third, do any kind of switchboard work and number about 25; B, the assistant foreman; and A, the foreman. Promotion follows in this sequence.

E, the common laborers, are helpers to Class D. They average in age about 25 years and are paid 24 cents an hour for an eight-hour day. They set up ironwork, paint frames, pack and unpack materials, put terminal blocks on the frame, stencil equipment, wax and sew cable on straight, and run temporary lighting circuits. In this work a man learns the apparatus and its place in reference to other equipment.

While Class E men need little education, they ought to have an eighth-grade education to get ahead. No previous knowledge about the work is required, as a man, if handy with tools, can learn anything he needs to know in a month on the installation work. Most new men are hired locally by the foremen, as this saves transportation; their only training is that gained by assisting Class D.

Promotion of these men is particularly advantageous to the company, as they are the only source of supply for the higher positions. Superior ability and efficiency lead to promotion and higher wages. If they could get instruction on the construction and use of the various apparatus and some technical knowledge of element, many would be advanced more rapidly; special night courses seem to offer about the only opportunity for this.

Class D forms the largest body in the installation work. In a busy year 200 are employed in the Minneapolis section and from 60 to 70 new men are taken on each year. Many are often transported by big companies to other districts. Their ages run from 20 to 25 years, and their wages average about 28 cents an hour.

The Class D man is required to do any work done by Class E and also must be able to connect cables to the terminal blocks and do a presentable job. He must know the apparatus, where it goes, the cable code, and how to fan cable and solder connections. This requires about six months' time on the job.

Slowness and awkwardness with tools and lack of comprehensive knowledge are the most common defects. Most of the men are promoted from Class E. No particular attention is given to training, but the E man's knowledge enables him to become efficient about half as soon as a beginner. An evening course in the winter months in theory of electricity, blue-print reading, and electrical currents would greatly aid these men.

Class C men are the highest grade on switchboard work. From C they may be promoted to B and A, or transferred to some telephone company desiring an all-round manager or maintenance man. In dull seasons they are retained to do Class D work, as the company can not afford to lose track of them. They are 26 to 40 years old and receive 28 to 36 cents an hour, in addition to the bonus described at the close of this section.

The Class C man takes measurements for additional cable racks and supervises D men working under him. He must be able to do any kind of switchboard work and explain plans and specifications. In addition to being active and systematic, he needs executive ability and tact. He needs a common-school education, a full knowledge of switchboards, and ability to read blue prints and specifications. He gains on the lower jobs the skill and the little tricks to save time, and these he must teach the men under him. There seems to be great need in his case of evening class instruction in theory of electricity, magnetism, and different kinds of circuits.

Class B and Class A men are considered together, as the B man is assistant to the A man on large jobs. They are from 25 to 40 years old and their wages from \$21 to \$28 a week. B men supervise C men and assist the foremen to inspect. They are seldom needed

when high grade C men are available. The A man or foreman keeps notes and makes and posts progress reports each week. He must report errors of the engineering department, send in connections for approval and changes, keep cost records on stock equipment and materials, and supervise the entire job.

A common-school education is absolutely necessary, as is executive ability in handling men and laying out work. Only men of superior equipment are promoted to these positions, and all have come up through the ranks. Practically all need training in reading plans and specifications and in the theoretical and technical side of electricity.

A bonus system is used to increase working efficiency of employees. To illustrate, a contract is taken to install, for \$4,000, a complete switchboard. The cost of material may be \$1,500 and the estimated cost of labor \$1,500, which leaves \$1,000. After allowing, say, \$600 for profit \$400 is left for bonus. The different classes of work are given a rate or an estimate by the foreman, and all the men save on the cost of installation is divided among those who work on any particular rate, each receiving an amount depending on his hourly wage and the length of time he put in at this rate. Fewer men are needed on a job under this plan, as those already on it do their best to keep the number small so as to increase their share of bonus. They also do more work than on a straight salary. If the cost runs over that allowed, the men receive a straight salary anyhow.

SUMMARY OF THE SURVEY STUDY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

Boys who have had the two-year day course in telephony at the Dunwoody Institute should find, in the opinion of the trade, a ready entrance and quick advancement in this branch of the electrical and telephone business. In the opinion of the committee, men already in the work should find courses meeting all their needs and helping toward promotion in the evening courses previously suggested for other electrical workers, particularly in the courses for telephone workers.

THE ARMATURE WINDER.

About 70 men are employed in this branch in Minneapolis. While the business is growing rapidly, improvement in protective devices for motors and generators has decreased the proportion of trouble, so as to keep the amount of work to be done fairly stationary. No trade organization exists among the workers, who may enter at 16, and are at their best when 25 to 45 years old. The work is clean and safe, but somewhat confining. There is no systematic method of employing and promoting men.

The men are of three grades: The apprentice, who is learning; the field winder, who can wind coils, but does not know how to put them on the armature; and the armature winder, who does all the real work of placing coils, making connections, and testing the finished job. The three represent the usual line of promotion.

The apprentice does different things in different shops. Usually he assists the field winder and makes himself useful around the shop. He winds coils, ties them, shapes and dips them in insulating compound, dips them for baking and finally bakes them ready for the armature. Before the coil is put on the machine he cuts sleeveings and slides them over the leads. There are 24 of these apprentices from 16 to 20 years old, who are paid from 75 cents a day to 14 cents an hour.

A strong, healthy boy, who understands English and has average intelligence, is required. He can become proficient in neatness and speed in a month or so. The usual deficiencies are lack of interest and ambition, and of sufficient education or understanding to get ahead.

Practically all new apprentices are boys from the city or surrounding country. Their only instruction is what they "pick up" as a helper. Better positions and better pay are certain for the promising boy. To make this work such as to insure a career the apprentice should have courses in elementary electricity, magnetism, and electro-magnetos. This he could get before he takes up the work or from evening classes.

The field winder operates machines for winding field coils of both wire and copper fits, cuts paper insulation for the strips, cuts insulation to fit pole pieces and assists the armature winder. There are about 35 field winders, who get from \$1.50 a day to 20 cents an hour, and are from 17 to 21 years old.

A field winder must know something of coils, conductors, and insulators, where much insulation is needed, and how to handle insulated wire without injury. About a year is required to gain the trick of forming coils and getting them properly insulated from the frame, all of which can be acquired under a good foreman. The winder is usually a promoted apprentice and gets no help or instruction other than that received as assistant to armature winders. The training suggested for the apprentice would benefit him.

The armature winder must be able to do all the field winder does, and also put coils on the armatures, test and pick out leads in circuits, and find open and short-circuited coils. He receives from \$2 a day to 63 cents an hour, and varies in age from 21 to 40 years, the average being about 35 years. Seven out of 10 new men are obtained from field winders; three from other companies. The nature of the work requires most careful attention to detail, otherwise trouble will result. Carelessness is the most serious fault.

New men are supposed to do the work without special training. About two years are required for a "green man" to learn it. There is practically no chance for armature winders to advance unless they go into business for themselves or go to larger manufacturing establishments in other cities. While there is no promotion, efficiency is recognized by a larger wage.

Armature winders should have the training suggested for apprentices and field winders and, in addition, should know how to make and work out winding diagrams. This training is also advisable for the apprentices and field winders as preparation for later duties as armature winders.

OVERHEAD AND UNDERGROUND CONSTRUCTION.

Originally overhead construction was the sole concern of the "lineman," but underground cables are now increasingly used in both power and telephone work. When the work on lines is in man-holes instead of on poles, the man is called a cable splicer. About 400 men are regularly employed in line work in and about Minneapolis, though after a storm or during a busy season many more are needed.

The sequence of promotion in most cases is as follows: The worker starts as groundman, then becomes a helper on overhead or underground work; if on overhead work, he becomes a lineman; if on underground, a cable splicer. He may become assistant foreman, foreman, trouble man, and finally superintendent in his department.

Employment is very irregular. Probably as many new men are taken on every year as there are men permanently employed. Employment is seasonal, the dull season being from December to April, and work varies spasmodically on account of storms. The regular workers in construction work are about as follows: Groundmen, 125; helpers, 20; linemen, 200; cable splicers, 50.

The groundman is the common laborer who digs ditches, carries loads, and does rough work, which he learns in about three months. His age is 17 to 60 years and his hourly wage 30 to 35 cents. There is no training for this work. Evening-class instruction in construction work and theory of electric currents, would tend to interest him and help him to advance.

The helper is really a groundman who also does some splicing and climbing. He is 21 to 45 years old, and his wage 25 to 30 cents an hour. Helpers are selected from the best groundmen, and training suggested for the latter applies as well to the former.

The lineman climbs poles, puts on cross wires, guys, braces, brackets, pins, and insulators, strings wires, and ties wires to insulators. On power work he hangs transformers and arc-lamp masts, and makes necessary connections. Probably 25 linemen are made foremen or

trouble men each year. Their ages vary from 20 to 45 years, their pay from 27½ to 44½ cents an hour, and when in camp \$40 to \$45 a month and board.

A lineman must know something of the system of circuits where the work is located, and be able to plan his work with skill and get it done quickly. While most of the knowledge and skill required can be obtained in one to three years, much time could be saved by evening-class instruction in blue-print reading, theory and use of electrical currents, and the actual practice to get greater manipulative skill.

The trouble man attends to transmission lines, repairs insulators, takes care of broken wires, and replaces transformer fuses and lamps. On telephone lines he locates faults and sends linemen to do the repairing. Employment is steady. The men's ages range from 27 to 45 years, their pay from \$70 to \$95 a month. It is possible for a studious lineman to work up into this position.

Tact and thoroughness are indispensable to the trouble man. He must know the city and the line on which he works, how to test all kinds of power equipment and use all methods of locating trouble. Most trouble men are first employed as assistants or short-term apprentices. Practically all lack technical instruction in the theory of electrical currents and in methods of locating trouble.

The foreman lays out the work, supervises construction, and reports to the superintendent. There is little chance of promotion. His age varies from 27 to 45 years and wages from \$55 to \$85 a month, with board, or \$85 to \$100 without expense money.

A foreman should be at least an eighth-grade graduate, should know the system and its circuits, and be able to read blue prints and follow specifications. Usually he is a promoted lineman of special ability in handling men and work. No special training is provided, as he is expected to learn by experience. A promoted man can become proficient in about six months; a beginner requires four or five years. A special course for foremen should include technical instruction in electricity and magnetism and training in drawings and blue prints with specifications.

SUMMARY OF SURVEY STUDY, AND CONCLUSIONS OF SURVEY COMMITTEE.

Probably the ranks of the linemen will continue to be recruited from the group of vigorous untrained workers of the community. Out of their number the best will find opportunities to get the technical instruction necessary to advancement up the line in the evening courses previously noted. Trouble men and foremen will find in these evening classes the technical information needed for the better equipment required for advancement.

CHAPTER VIII.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR THE METAL TRADES?

The metal trades are the largest and, excepting flour and grist milling, the most important lines of industry in Minneapolis. The five principal branches of the work are: Foundry and machine products; car repairing and construction; copper, tin, and sheet-metal products; electrical machinery and supplies; and automobile repair and construction. These trades ranked first in 1914 in number of employees and establishments, and second only to flour milling in total value of output.

The most important branches of the metal trades in the city are foundry and machine-shop products and car repair and construction. The former ranked first in number of employees, third in number of establishments, and third in value of product; the latter ranked fifth in number of employees and fifth in value of the product. Car repair and construction, it must be pointed out, however, includes not only metal work, but also a wide variety of wood and electric work, in which more than half of the men are employed.

The metal trades, with the exception of car repair and construction, are growing more rapidly than most other industries of the city. In the five years, 1910 to 1914, inclusive, employees in foundry and machine shops increased, according to the industrial survey for 1914 by the Civic and Commerce Association, from 3,254 to 5,124, a gain of 57 per cent; those making copper and sheet-metal products from 472 to 689, a gain of 46 per cent; those in electrical machinery and supplies, a comparatively new business in Minneapolis, from 149 to 276, a gain of 85 per cent; while those in car construction and repair increased from 2,683 to 2,723, a gain of only 2 per cent. The last, however, is a somewhat fixed industry, confined to the needs of local street railways and steam railroads.

Like practically every other industry in Minneapolis except flour and grist milling, the metal trades are carried on in many small shops. The average number of employees in foundry and machine shops is about 50; in copper and sheet-metal shops, 9; in electrical machinery and supply shops, 21; in automobile repair and construction shops, 11; and in car repair and construction shops, 454. There

are, however, a number of large establishments making foundry and machinery products.

The distribution of the metal workers among the different lines is shown by the following table, made from the tables prepared by the Minneapolis Civic and Commerce Association Survey for 1914:

TABLE 10.—DISTRIBUTION OF FIRMS AND OF EMPLOYEES OF METAL TRADES ACCORDING TO KIND OF PRODUCT.

Product.	Firms.	Employees.
Agricultural implements.....	3	248
Automobile parts.....	17	502
Babbitt type metal solder.....	3	15
Bicycle, motor cycle parts.....	1	.....
Brass and bronze products.....	4	46
Car manufacturing and repairs—steam.....	6	2,923
Car factory.....	1	.....
Electrical machinery.....	13	276
Fire extinguishers.....	1	.....
Foundries and machine shops.....	102	5,124
Gas and electric fixtures.....	9	74
Iron and steel, doors and shutters.....	3	142
Iron and steel forgery.....	1	.....
Models and patterns.....	7	55
Sales and vaults.....	4	90
Scientific instruments.....	1	.....
Stove pads and repairs.....	4	77
Street and railway shops.....	2	184
Wire goods.....	5	51
Employees not itemized.....	.....	269
Total.....	192	10,076

It was impossible to cover all lines and all shops in the metal trades for this report. In Chapter VII a description is given of the organization of the car shops of the street-railway system, but no special study of metal work done there was made, as its problems and demands upon the worker are practically the same as in other metal shops of the city. In the same chapter consideration is given to manufacturing, repair and construction work in electricity. This chapter will consider only the machine, boiler, automobile, and sheet-metal shops and the foundry.

THE MACHINE SHOP.

THE RAILROAD SHOP.

About 2,723 workers are employed in all the railroad shops in Minneapolis. In the plant described in this section there are 400 men in the standard organization of the machine shop proper, but in the last year this was reduced at one time to about 300.

To the foreman of the machine-side shop an assistant, several gang foremen, and the foreman of the tool room report. The floor-side foreman has an assistant and a number of gang foremen. Actual work is supervised by the gang foremen, who are specialists in the work. They are practical workers and able to teach men under them. The assistants order repairs, inspect, and meet datings for delivery

of work. Planning work and hiring are done by foremen, who also are practical men in their line.

The casualty-insurance rate for machinists is 88 cents per \$100 of pay roll. From the safety standpoint this compares favorably with structural-iron workers at \$8.98, bricklayers at \$3.99, and flour workers at \$1.68. The State factory inspectors are receiving the cooperation of the railroads in a safety campaign, which is growing larger and better each year. This is helping to create a demand for a class of specialized workers.

There is no fixed line of promotion among the workers, with the exception of apprentices, who are sons of employees or are known to some member of the organization. They must be not under 16 or over 21 years old and are paid 12, 16, 18, and 24 cents an hour for the first, second, third, and fourth years, respectively. At present 24 are employed. Last year four were promoted to machinists, four left, and four were hired. The company furnishes an instructor to supervise them during a service of 48 months.

Physically the apprentice must be of good appearance, have good eyesight, and no tubercular, epileptic or rheumatic tendencies, or defective fingers. He should be obedient to authority, mentally alert, and ambitious. Ability to imitate will enable him to become a first-class workman on repeat jobs, but to be a high-grade artisan he should love machinery and have native ability. An eighth-grade education will enable him to do the actual work. Knowledge and skill are acquired by experience. Lack of ability to apply their academic education is a common deficiency. Many applicants are hired by the superintendent of shops. The part-time school for apprentices and special classes in night schools for journeymen are favored by this plant.

The machinists in this plant are about 97 per cent organized. When the shop is running full, approximately 210 are employed. Of these, the roundhouse uses 15; the floor side, 109; the machine side, 80, and the tool room, 8. Last year as low as 66 have been on the floor and 65 on the machine side. Three were promoted to assistant foremen, and 58 left, of whom two died. No new workers were hired. The ages vary from 21 to 58, with an average of 35 years, and the wage rate is 44 cents an hour.

The term "machinist" in railroad work really covers distinct types of workers. By "type" grade is not meant, as a worker may be a high-grade roundhouse, floor, or tool-room machinist or machine operator. Few workers are first class in more than one kind of work, but exceptional combinations, such as roundhouse and floor machinist, or tool room and machine operators, occur. The latter is not a natural combination of late years, as speeding up for produc-

tion on the machine is not conducive to precision work—an absolute essential in the tool room.

The Roundhouse Machinist.

The roundhouse machinist is required to make "running repairs." These, in many cases, are temporary repairs necessary to keep a locomotive in service during a rush or perhaps during one trip only. As wear on different parts is not uniform, it frequently happens that just before a general overhauling in the back shop temporary repairs may be made on the worst worn parts to get the maximum out of the better wearing ones. The time allowed is, in most cases, limited and the grade of work, while good for a roundhouse job, might not pass in a back shop.

The roundhouse machinist meets practically all repairs on locomotives and cars without many facilities. He must have considerable native ability, ingenuity, and patience, and good knowledge of a locomotive and the conditions under which it operates. Few blue prints are used in roundhouse work. The roundhouse machinist must be skilled in the use of hand tools, as few machine tools are used, and he must be conscientious. It is impossible for a foreman to watch the work closely. Carelessness may cost anything from dollars to life. Good roundhouse machinists are the most difficult to hire or to train, ordinarily. The roundhouse machinist will succeed on the floor oftener than the back-shop floor machinist in the roundhouse.

Roundhouse work includes making and replacing worn or defective gaskets in joints; repairing or replacing piston rods, valve stem, and other packings; regrinding check, globe, pop, and other valves; relieving guides, truing up pins, closing brasses, replacing broken or worn rings in cylinder and valve pistons; intercepting valves, pinioning worn rings, shining and adjusting shoes and wedges, repairing and adjusting air pumps and parts; and other parts of the locomotive except the boiler and tender.

The Back-shop Floor Machinist.

The back-shop floor machinist does the stripping, bench work, erecting, and adjusting of the overhauled locomotive. The work is of a better grade than is done in the roundhouse, higher standards of workmanship are demanded, and the work is largely specialized. By specialized machinist jobs is meant not that the worker can do only the job at which he works, but has developed skill at some particular work and is left at it. The shop described in this study has specialized its work on both the floor and the machine sides. Some railroads do not specialize these shops.

The Machine Operator.

The work is graded on many of the machines, making it similar to a manufacturing proposition, thus enabling the man from a contract or job shop outside to succeed from the start; while on a floor job he would have to be taught most of the work, and it would be much more difficult to do roundhouse work.

Railroad work is not more difficult nor held to closer limits than work in many contract shops, but the limits are made to fit a machine working under conditions so different from almost any other that much of the work must be learned on the job. For instance, on a crank-pin bearing of a 150-horsepower stationary engine, an $\frac{1}{4}$ -inch lateral would be considered ample, while on the corresponding bearing on a locomotive a $\frac{1}{8}$ -inch lateral is standard on many roads. This enables a locomotive to take a curve without heating the pins. There are many other differences.

Less native ability is required of machine operators than of other machinists, because of the repetition of a comparatively few operations. Some operators get work requiring high skill and considerable knowledge, both of railroad and general work, as experimental and development work with machines is done largely by them.

Two operators of this kind turn the armature shafts for headlight and corner lighting equipment, and do such work as making long, straight, finished holes without tool marks. This requires fine grinding and close measuring. It also requires clever manipulative skill in using the cross feed to overcome taper tendencies.

Some pieces are light and require skill in chucking or anchoring on the machine so they will not be sprung out of shape. The operator must know how to take rough cuts and relieve strains before taking finishing cuts.

Machines on this work may be used for shaper, drill-press, and milling-machine work, as well as lathe work. Some work is close enough to take into consideration even a small heat factor when finishing. Consequently, the work is of high grade and requires experience, skill, an appreciation of close limits, and native ability. It is done from sketches and blue prints. A worker to hold a job of this kind must have considerable mechanical knowledge of a practical but seldom of a technical character. Of 80 machine operators only 2 have positions of this kind.

The Tool-room Machinist.

Tool-room machinists do the more difficult repair work required on the plant equipment, keep small tools in repair and make new tools, jogs, and fixtures used in this plant and others on the system. Repair work consists of making new centers, screws, operating nuts,

and other wearing parts of lathes; replacing broken teeth in gears and making new gears; truing up work rails and ways; bushing worn pulley holes; making handles, cranks and operating levers, tool posts and clamps, tool-post and tool-clamp screws and arbors of all kinds. This work is largely duplicating samples, although in some cases changes are made to increase strength or wearing qualities.

Tool-room machinists also keep in repair air motors, hammers, jacks, and other portable tools. This includes mostly replacing defective parts supplied by the manufacturers of the tools. Some of the portable equipment is designed and made in the plant. Other repairs are in connection with rollers and pins for flue welders, special dies and punches, air, steam, and spring hammers, bolt-header dies and shear blades. Drills, reamers, taps, and cutters of all kinds are ground in the tool room. Few blue prints are used on this work.

All the taps, milling cutters, and solid reamers used on the railroad system are made in the tool room, but this is very unusual. The jigs and fixtures run from a simple plate jig with one or two holes to special machines, of which there are quite a number.

Good workmanship and a high degree of skill are necessary, as this work is often far removed from standards and it requires great native ability and ingenuity to do "nonstandard" work on standard equipment.

Further description of work by machines is unnecessary, as a tool-room machinist, in most cases, is able to operate a drill press, shaper, milling machine, lathe, grinder, and mill in a first-class manner. He must be highly skilled in the use of such hand tools as hammer, chisel, file, broach, and scraper. A knowledge of steel and its treatment is an asset. Keen appreciation of precision work is the largest mental factor, and patience is a necessity. Good eyesight and steady nerves are needed more than in any other branch of the trade.

THE CONTRACT SHOP.

Most of the machine-shop work of Minneapolis is done by contract shops, only about 30 per cent of the workers in the business being found in the railroad shop. A contract shop contracts to do work of every kind, as contrasted with the railroad shop, where only repairs are made.

Space available for describing the machine-shop work of Minneapolis will not permit extensive treatment of the railroad or contract machine shop. The foregoing account of the railroad shop and the machines and processes used in it applies in most particulars to the contract shop. It remains to point out certain additional facts about the contract shop.

The hiring of men for the contract shop is done in various ways. Usually superintendents or foremen employ new workers. In only one shop was there a labor agent or employment manager. This shop was the only contract machine shop where the survey found a medical and physical examination used as part of the employment scheme. This shop also maintains its own liability insurance. All the other shops carrying insurance receive their protection from some casualty company.

The contract shop employs practically the same tools and machines used in the repair work of the railroad shop already considered. In addition, it uses many machines either rarely used in railroad machine shops or entirely foreign to them.

Milling machines are seldom used outside tool rooms in railroad shops. They are extensively used as production machines for flat work in contract shops. Designs of fixtures or set-ups for machines are usually made by machinists, while the machines are usually operated by a specialist who may know only the operations he is instructed to perform. There are, however, all grades of men concerned with milling-machine work, varying from the operator with manipulative skill, who merely does what he is told, to the man who makes his own set-ups for cutting bevel and spur gears and makes dies. Ordinary milling-machine work is paid as piece or day work, but high-grade work is all paid for by the day. Wages range from 20 cents an hour for ordinary operators to 60 cents for exceptional men of the experimental shop.

Gear cutters are extensively used in contract shops, but practically never in railroad shops. Here again the skilled machinist makes the set-up for a number of different machines known as a battery, operated by a specialist who may be able only to follow explicit directions. The work is less skilled than that of the milling machine. Wages range from 15 cents an hour for the ordinary operator to 40 cents for the machinist able to set up or run the machines on better work.

Hobbing machine and gear shapers are even more rarely used in railroad shops. In the contract shop they are classed about as gear cutters as regards skill and wages.

Gear planers require a higher grade of workman than the other machines, as knowledge of mathematics and ability to read blue prints are necessary. Wages are from 35 to 40 cents an hour. These machines are practically never used in the railroad shop.

The broaching machine, while not demanding high skill, requires an operator careful and painstaking in planning work. The wages run from 30 to 45 cents an hour. These machines are almost unknown in ordinary railroad shops.

The cylindrical and surface grinders are becoming popular in contract shops for taking finishing cuts on cylindrical and flat work, because it can be done more quickly and precisely than by the old-fashioned method of the file and emery cloth. Few of these machines are used in railroad shops, because case-hardened and alloy steels upon which grinders are most effective are not popular in railroad machine construction. Being less susceptible to the crystallizing effects of weather conditions, these machines are largely used wherever possible. In most cases operators are paid from 20 cents an hour for the ordinary operator to 45 cents for the operator of the heavy crank grinder.

Precision lathes are practically never found in railroad shops and seldom in general contract shops. They are most frequently used in the experimental shop where careful work is done in the construction of models and trial machines. Strictly high-grade men receiving wages of 45 to 60 cents an hour are employed.

Automatic bar and chucking machines are usually operated by men able to make set-ups on the machine and operate it, though in some cases the machinist may make the set-up for an ordinary generator. Wages are from 20 to 60 cents an hour. These machines are almost never used in the railroad shops.

The die maker is used only in the making of bolt headers, hammer and bulldozers. The machinist has no opportunity to treat or harden the steel, as that is considered blacksmith work. At least 25 are employed in the contract shops of Minneapolis. As a class they rank even higher than tool makers and are paid 40 to 65 cents an hour. They must be able to read blue prints and make drawings. Great precision is required. They must have knowledge of the properties of metal, particularly iron and steel, worked under different conditions.

The machinist of the contract shop, who might be called the "all-round man," can do floor work, bench work, or machine work. He should be able to make and treat his own cutting tools and have a working knowledge, gained by experience, of the general lines of machines manufactured, including farm implements, flour and saw-mill machinery, gas and steam engines, and of the requirements as to closeness of fillings and adjustment required in the different parts of such machines. He should know how to read drawings. Wages range from 27½ to 45 cents an hour.

The greatest difference between the railroad and large contract shops lies in the fact that the work in the latter is more highly specialized, both in men and equipment.

Building in large quantities, they can afford to use more single-purpose machines and break in operators of very limited initiative. The set-ups on the machines are planned and made by machinists.

By machinists is meant all-round men; single-machine operators or "workers" on one class of bench or erecting work are classed as specialists.

A few specialists' jobs require considerable skill and native ability. The work is close, in some cases done from blue prints, and requires accuracy with hand tools or measuring instruments. Most of the work is done in jigs and fixtures so designed that the piece to be machined can be placed only the correct way. The cutting tools are sized in the tool room and checked to the worker, who often is not held responsible for the sizes, the company having inspectors, head operators, or a machinist for this purpose.

There are a few first-class machinists outside of the tool room for doing experimental and special jobs too small to specialize or jig. Most tool-room workers are good machinists. The smaller the plant the larger the per cent of high-grade men used.

As contract shops do many classes of work, ranging from farm implements to high-grade motors, jig fixtures, and testing and measuring devices, the contract machinist acquires a more varied knowledge than the railroad machinist, whose work is confined to locomotive, steam shovel, derrick, water pump, gas and steam stationary engines, and a limited amount of electrical machinery repair work. The locomotive excepted, work on these machines is done by a few specialists.

Most tool-room workers in railroad shops are trained in contract shops. A very few shops are devoted almost entirely to experimental work, and the workers are the highest class and highest paid machinists in the city. Their work ranges from a broom holder to a type-molding machine. They work according to anything from verbal instructions to blue prints.

SUMMARY OF THE SURVEY STUDY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

The conferences held by the survey with employers and employees for the machinist trades recognized the very great need for the thorough training of promising workers, ambitious for advancement to positions of greater responsibility and better income. While the trade understandings established for the other trades, as described in various chapters of this report, were not completed with the machine shops, there was a common agreement in the conferences as to the demand for training and the courses needed.

For the worker in the railroad and other machine shops, whether helper or special tool hand, an evening course, in the judgment of the survey committee, giving practical shop instruction in the operation of modern machine tools would give breadth of equipment not usually gained in the regular shop experience. In connection with

such a course, instruction should be given in the calculations required for the setting up and operation of the various machine tools, the methods of laying out templates for jigs and dies, the properties of metals dealt with in machine work, and experience should be afforded in the use of different types of high-speed cutting tools.

Such workers also need opportunities to attend classes in mechanical drawing, and finally a very profitable course in what may be called the trade science of the metal worker might be developed. Such a course would deal with instruction through simple apparatus in the strength of materials and the mechanical principles involved in tool and machine operation, and might well be open to the entire group of the metal trades.

For the journeyman wishing to qualify for foremanship, in addition to the foregoing, a course should be provided giving advanced work in the more complicated tools, such as universal milling and grinding machines, vertical and horizontal boring mills; practice in the design and construction of jigs and fixtures for the rapid production of interchangeable parts, and other instruction in modern methods of manufacture.

For the apprentice already employed part-time courses, which take a part of the working time of the youth for helpful instruction, were approved. For the boy desiring to enter the trade, two-year courses at the Dunwoody Institute, which prepare the boy for advanced standing as an apprentice when he enters the shop as a commercial worker, were approved both by the conferences and by the survey committee.

THE BOILER SHOP.

The United States Census on Occupations for 1910 reported 304 boiler makers for Minneapolis. In 1915 there were 15 shops. In this study a shop which is a part of the general shops of one of the railroads was used, because it was typical in its processes and presented a unique plan for the classification and promotion of workers.

In this boiler shop the worker is first hired as a helper or apprentice and may be promoted through two classes of handy men and 13 of boiler makers, including the layer-out, the best and highest paid class. Any helper with capacity has opportunity to go to the top, which at all times offers the incentive of better pay.

The man with physical but not mental ability to advance is given opportunity after reaching the ninth or eighth class to go to the flue gang. The work of this gang is a matter of physical endurance and manipulative skill. By constant repetition the worker acquires an efficiency which enables him to make, by a premium plan, up to the rate of a third or second class boiler maker.

From any position a worker may go to the machine jobs—threading machine, drill press, shears, punches, and flue welders. There are two classes of drill press and shear men and three of flue welders. The classes pay different rates. The workers are eligible to examination for locomotive firemen. There are no cases on record of examinations having been taken.

Machine operators may lack either mental capacity or application. In many cases they have to take the position yielding the most in the shortest time. The line of promotion is definite and progressive. As there is always a demand for layers-out at good pay, the opportunities are good.

A bonus or premium plan is employed. The worker is guaranteed an hourly rate and a bonus for extra production. The foreman is, nominally, director of the instruction. The worker in any class is instructor for his helper, who, in turn, teaches the worker following him. The example set by the foreman in "giving up" his knowledge results in a noticeable absence of secrecy among the men as to tricks of the trade.

Only 7 men beyond the grade of first-class handy man left during the past year. Of these 1 was discharged and 2 died. Twice the company has provided an instructor for mechanical drawing, but the men have not taken advantage of the opportunity to any great extent.

Beginners average about 23 years old. They are mostly men who have had no opportunity to learn a trade, or have just learned to appreciate a steady job and an opportunity to earn more than a common laborer. Workers in any class can, and do, "make into the bonus" during ordinary times. They have a pride in their work and the product is high grade.

The helper or lowest paid man—there are 39 in the station force—trucks material about the department; "bucks up" by holding a "bucking bar" on rivets being driven or "headed"; uses hammer and chisel to split nuts riveted or rusted on bolts so tightly they can not be wrenched off; wrenches off nuts or holds bolts from turning; and strikes with a sledge when metal is to be punched or cut with a cold cut. He ranges from 21 to 26 years old, averaging about 23.

All nationalities are employed. Some can not speak English and are placed in gangs where their countrymen can teach them. The man in the class above is generally boss and instructor. The pay is 23 cents an hour and the helper is paid a bonus based on the proportion of his hourly rate to that of the worker he helps.

The helper must be robust, "rough and ready," and not minus even a finger. He must be alert and have imitative ability. Good eyesight is necessary to advance to "layer-out." No education or knowledge of a general kind is necessary, and no special training is given until ability to read blue prints is required. Superior ability is recog-

nized by promotion and increased wages. Of 34 men last year, 14 left during the probationary period, 5 were promoted to second-class handy men, and 20 new men were hired.

The first-class handy man and the second-class handy man, the latter a helper for the former, strip ash pans and front ends of boilers; take out and replace bolts; cut pieces of sheet steel to replace defective parts, and do most of the rough work around boilers. In most cases the defective piece is used for a template with which to lay out the new piece. There are 11 handy men in the plant studied. Five were promoted to thirteenth-class boiler makers and two left. The prevailing age is 24 years and the pay from 25 to 25½ cents an hour, with a bonus. As the handy man puts up the required parts he accumulates some knowledge of the construction of different kinds of boilers. He seldom has to use a rule. Skill is a matter of the use of hammer and chisel, punch, wrench, and sledges.

The thirteenth and twelfth classes of boiler makers strip fire boxes, cut off heads of rivets with cold cut, punch rivets out of round ring, and drill out stay bolts and radial stays with a pneumatic drill. A drill of approximately one-eighth inch diameter, smaller than the bolt's diameter, is chucked in an air motor which furnishes the rotary power. To feed the drill into the metal a screw is provided on the motor opposite the drill. The outer end of this screw is pointed and hardened to bear on the arm of a device known as an "old man." This device consists of an upright shaft anchored to a foot and supporting at right angles an arm which can be adjusted at any place along or around the shaft. To set the drill the "old man" is clamped by its foot to the sheet and the arm is adjusted and anchored to a position in line with the bolt to be drilled out, so that the point of the drill rests on the head of the bolt and the point of the feed screw bears against the arm. The power is then applied and a hole approximately three-quarters of an inch deep is drilled. There are several hundred of these holes to be drilled in any fire box requiring new wrapper sheets. The prevailing age of the worker is 25 years and the wage rate 27½ to 28 cents an hour, with a bonus. A knowledge of fire-box construction is gained in the work which is of value later.

The eleventh and tenth classes of boiler makers do "low-pressure work." They thread stay bolts and radial stay holes with a tap used in the air motor; screw in the bolt with motor and cut to proper length for driving or riveting; repair and patch tanks, laying out a new piece of metal for the patch, drilling holes in defective sheets, and driving rivets; and make replacements of broken stay bolts in locomotives in service by riveting the ends of the stay bolts. The use of an air hammer or "gun" and construction of tanks and rear

ends of boilers are learned. Eight men are employed, the prevailing age being 34 years and the pay 30 to 30½ cents an hour.

The ninth and eighth classes of boiler makers drive or rivet with the "air gun" the head of the stay bolts or radial stays of the boiler. They drill the sheet for the arch tubes and cut them to length, and roll or expand them until they are light in the sheet, after which the ends of the tubes on the sheet are beaded. Workers who have not the desire or ability to go on with the trade are put in the flue gang. The prevailing age of these two classes is 28 years and the hourly rate 32½ to 33½ cents. The worker should be able to read figures and count, as he here, for the first time, uses a rule. Beginning here, he must also increase his knowledge of boiler construction and erection.

The seventh and sixth classes of workers do their first high-pressure work with rivets, which they drive in the mud rings, the smoke arches, new tanks, stationary smokestacks, breechings, and structural-iron work. The assembling of the work is not difficult. Strength and endurance are required, and the general tendency is to increase the workers' speed and efficiency. There were only three workers in this class, whose prevailing age was 30 years and rate of pay 34 to 35 cents an hour.

The fifth, fourth, and third classes of workers rivet the straight course of the boiler to the front flue sheet and to the dome course; the dome to the dome course; the dome course to the taper course; the taper course to the throat sheet and outside wrapper; the throat sheet to the outside wrapper; the outside wrapper to the back head; and the inside wrapper to the rear flue sheet and the door sheet. They put in and work all the radial stays; chip and calk with "gum"; apply with rivets all boiler brass, crowbars, crowbar brasses, and flexible stay bolts; lay out but do not cut or drill patches for boilers and fire boxes when they rivet and calk; and shape, fit up and rivet new tanks.

The nine workers in these classes receive 25½ to 45 cents an hour. They are given opportunity to lay out work which requires appreciation of close dimensions. They must use dividers, rule, scale and trams for layout work and measure the thickness of the sheet from which patches or new sheets are made. In some cases the drilled patch may be used for a template to locate holes to be drilled in the cracked or burned sheet, in others trams and dividers must be used to locate holes in the patch to correspond with those in the defective sheet.

The layer-out or first-class boiler maker lays out coal buckets, ash pans, petticoat pipes, boxes for racks, stationary smokestacks, and breechings which he must fit up and shape. He also lays out new

tanks, smoke arches, straight courses, dome courses, front flue sheet, taper courses, inside and outside wrappers, back flue sheet, door sheets, back heads, and throat sheets. The six men employed average about 40 years old and receive 44½ cents an hour.

The worker must be accurate and know the practical work to get the best results. He must understand boiler construction and erection. His knowledge of arithmetic must include mensuration. The men would profit by a short-unit course in descriptive geometry, treating of the intersection of curved surfaces, and in mechanical drawing and free-hand sketching.

The apprentice to the boiler maker begins as an errand boy, is then put at heating rivets and passing them to the riveters, and from this is advanced to the thirteenth class of boiler makers. Usually he is a son of an employee, or, in organized trades, of some one known personally by some member.

On entrance, he must be not under 16 nor over 21 years old, the prevailing age being 18. He must have good health, not tubercular or epileptic, have good eyesight, and be without physical defects, such as stiff joints. Physical alertness and endurance are required. The five apprentices of this shop were paid 12 cents an hour at the start and a bonus in the proportion which their rate of pay bore to that of the boiler makers with whom they worked.

He should have ambition and high ideals of skill and workmanship. He should have patience and respect for authority, mental capacity to absorb the many "tricks of the trade," and ability to use them. At least an eighth-grade education is necessary.

Flue men and machine workers are men shifted from the regular line of promotion to first-class boiler maker because they lacked ability or desire to pursue the trade further. The limits of this treatment of the boiler shop prevents detailed consideration of their work.

The foreman of the boiler shop is always a man who has served his time as boiler maker and had a "boomer" experience for several years. In addition to his duties as head of the department, he is an adviser to the chief engineer and has charge of all experimental work relating to sheet metal. He must have theoretical and practical knowledge of the physical and chemical properties of iron and steel, the action of waters and acids on them, and the effect of different kinds of service on the boiler and parts of it, and should know how to read blue prints and make free-hand sketches and simple drawings.

An assistant to the foreman who has active charge of the work supervises and inspects it and instructs the men under him. He plans the work to meet datings set for new and repair work, must have complete practical knowledge of the construction of a boiler, and must be able to set the pace. He comes from the ranks, is in line of

promotion to foreman, and should possess the same qualifications and knowledge.

SUMMARY OF THE SURVEY STUDY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

It seems to be a universally accepted opinion that so far as the practical side of his work is concerned, the boiler maker must be trained on the job and not in a school. In fact, there is no school anywhere which attempts to teach this trade. The nature of the work is such as to make it impossible, even if it were advisable, for the school to give instruction in the actual process of making boilers. Furthermore, the apprentice or the helper system used in most shops seems to meet in a satisfactory way the demands of the trade as to mechanical skill in the tools, machines, and processes employed.

In the foregoing description of one extensive and highly organized boiler shop, all the men beginning with the fifth class and running up through the first-class boiler makers and foremen need a knowledge of mensuration and drawing which the shop can not give and which, in the opinion of the trade, should be taught by a school. This same need exists among all the boiler makers whose work is less specialized in the smaller shops. When such courses are given, they should be open to all men in line of promotion, including helpers, apprentices, and boiler makers of different classes.

In general, the boiler maker, if he expects to advance to work of the first class, should know how to draw and lay out the sheets of metal for any boiler or tank job and to calculate the dimensions, sizes, and forms of sheet metal as they are involved in the construction of coal buckets, ash pans, petticoat pipes, boxes of various kinds and sizes for racks, stationary smokestacks and breechings, tanks, smoke arches, straight dome and taper courses, inside and outside wrappers and back flue, door back head, and throat sheets.

Whenever possible, in the opinion of the trade and the survey committee, a special evening class should be formed to give this instruction to boiler makers. Where the number of applicants does not justify the establishment of such a class, the boiler makers might well attend such a course as that provided for sheet-metal workers. It is probable that a few exceptional men in the boiler shops would desire to attend practical classes in forging and general machine work, to give them practical skill not obtainable in the shop and needed by the all-round high-grade boiler workers.

The rapid introduction of autogenous welding by the use of the acetylene and oxyhydrogen blowpipes which weld metal that was formerly pressed or expanded and riveted, not only decreases the number of boiler makers needed in the shop but makes it necessary

for some of them to learn the new process. Courses in autogenous welding in evening classes would open this opportunity to those already experienced in other parts of the trade.

AUTOMOBILE INDUSTRY.

Minneapolis is the largest distributing point for automobiles northwest of Chicago, serving Minnesota, Iowa, Montana, North Dakota, South Dakota, and a part of Wisconsin. It has in use about 12,000 automobiles, or one out of every seven in the State, the gain for 1915 over 1914 being over 22 per cent.

The report of the Civic and Commerce Association for 1914 shows 135 automobile establishments, employing about 1,500 wage earners, in Minneapolis. Of these establishments about 50 were those of retail and wholesale dealers, usually with repair shops and garages attached; about 40 were repair shops; 11 shops of dealers in accessories; and 6 plants of manufacturers. The gain in number of cars in 1915 over 1914 would indicate approximately 335 new workers in the last year, making the total for 1915 about 1,835.

The total volume of business in 1914 was about \$40,000,000. This includes the output of the Minneapolis branch of the Ford Motor Co., which turns out from 50 to 90 cars a day in the busy season, and the sales of a number of large distributing plants which ship cars directly from the factory to points in six States. It is evident that the business shows an increasing demand for workers.

Only the work of the large automobile establishment is treated here, but every feature to be found in the small garage and service station is included. No attempt has been made to deal with the manufacturing of cars, which in Minneapolis consists either of the assembling of parts shipped from central factories in other cities or of local manufacturing. The latter has been considered elsewhere. A large automobile establishment is usually a plant operated by a concern that sells one or more standard cars and also carries on a storage garage and repair service.

There is no particular physical or nervous strain on the worker. The work changes frequently from one kind of car to another. This makes tasks more interesting and gives the worker a rest. In the service and testing departments the gasoline motors sometimes miss fire and the unburned or partly burned gases are exhausted into the room, sometimes causing severe headache, which fresh air or sleep will cure. Most large shops have an exhaust fan to carry off this gas. The number of accidents is small and the casualty rate for automobile mechanics less than that of most workers in the building trades, foundries, and flour mills, but more than that of woodworkers, bakers, machinists, and painters.

Nine hours is the usual working-day, which begins at 8 a. m. and closes at 6 p. m., with an hour for lunch. In a few firms the worker has Saturday afternoon off. Only the better class of workers is in demand in the winter season, when the overhauling of cars is done. The rush season, which is controlled entirely by the weather, begins with spring and lasts until bad weather in the fall. There is no organization among the workers. Employees enter from 16 to 40 years old. A man is considered at his best between 25 and 35.

Probably 400 new workers were needed last year to take care of the 2,000 additional cars in Minneapolis. First-class mechanics are few and hard to get. Many mechanics are poorly trained. They usually start as helpers and are promoted to different departments and positions. The average wage of a good mechanic runs from 40 to 50 cents an hour. Promotion is rapid and many young men are looking forward to this work.

The old-time first-class mechanic is not a first-class man in the automobile business unless he reads, studies, and keeps up with the times. Most of such men lack the technical knowledge to meet the growing demands of the many improvements, such as electric starters and lighting systems, and electric gear shifts.

Many young men are specializing in this new class of work, and the demand for them is increasing. Foremen and superintendents often are imported from other cities or taken from other firms in the city. They are usually 25 to 35 years old, and have come up through the ranks and become leaders. Even these men often lack technical knowledge.

There is no system of selecting workers. They are usually hired by the head of each department with the approval of the superintendent. Few firms have application blanks. When used, they usually call for little more than a list of references. If a man makes a good impression, he is given a position and is tried out by the foreman. No special training is given. A beginner who shows an interest in his work is promoted rapidly. There is no special line of promotion.

The five departments of an automobile garage and repair plant are the garage, service, parts, loading, and testing departments. As only the service department has to do with the mechanical and repair end of the business, only this work is here treated.

SERVICE DEPARTMENT.

Workers in the service department include tool men, helpers, battery men, magneto and self-starter men, blacksmiths, machinists, mechanics, assistant foremen, job clerk, and superintendent or foreman. The line of promotion varies, as the tool men, blacksmiths, machinists, and job clerks usually stay in their respective positions. Helpers are promoted to battery men, self-starter men to mechanics,

and some mechanics to assistant foremen. All the men work the same hours, usually nine, though some plants arrange for a 54-hour week with only a half day on Saturday.

Tool men, from one to three in number, are employed where a firm has a tool room. They issue tools, supplies, oil, waste, grease, and bolts to the workers on order from the job clerk or foreman. The tool man is 18 to 25 years old, usually about 20, and must be able to read and write. He usually has a fair education. His wage ranges from \$10 to \$15 a week. He may become a helper in some department and be promoted up the line.

The helper does all kinds of work in the repair department, cleaning parts, running errands, and helping tear down motors, transmissions, and axles. He works with a mechanic and may be promoted to be a mechanic. Usually he is 20 to 25 years old, has a fair education, and is paid 10 to 25 cents an hour. The best helpers soon learn the construction of an automobile. From two to three years of apprenticeship must be served before the helper can become a mechanic.

The **battery man** does nothing but battery work, such as repairing broken batteries, putting in new parts, rebuilding, and charging. He is 20 to 35 years old, and is paid \$15 to \$25 a week, according to his ability. Usually he has a fair education but no technical training and has learned the business by working at it. He is seldom promoted, as his work is a trade in itself. Many battery men are employed by electric garages. As the number of storage batteries used on automobiles is increasing rapidly, the demand for battery men is also increasing and good men are scarce.

The **magneto and self-starter man** is a specialist who overhauls, repairs, and adjusts all kinds of coils, magnetos, starting motors, and generators, and does electric wiring on automobiles. Such men are 23 to 40 years old and their pay ranges from 30 to 50 cents an hour. This job requires intelligence, as some parts of the work are very complicated. Many of the men lack practical experience and an even larger number technical knowledge of electricity. Some of the best workers have been electricians with telephone companies and thoroughly understand electricity. Some magneto men want to be mechanics, as they do not like the specialty work. As more and more electrical equipment is being put on automobiles the demand for good men is increasing rapidly.

The **blacksmith** is found only in large establishments where some of the parts are made and where both general blacksmith work and drop forging are done. He is 25 to 40 years old and is paid 30 to 38 cents an hour. Most blacksmiths are without special training. They are seldom promoted, but, in exceptional cases, may become mechanics.

The machinist does work similar to that done in any general machine shop. He works to micrometer and fits and makes automobile parts. Usually his experience is gained in a regular machine shop, and he lacks training and technical knowledge of mathematics and drawing. What has been said in this chapter as to the need of special courses for machinists applies to him. The machinist generally remains as such, but a few are promoted to be mechanics.

The mechanic does the general repair work on automobiles. He overhauls motors, clutches, transmissions, rear axles, and all other parts of the car. Usually he is 20 to 45 years old and receives 30 to 60 cents an hour. The mechanics come from all parts of the United States. Some are "floaters" and some steady men. Many are not good mechanics, as they lack training in mechanical skill and technical knowledge of the automobile. Employers often are compelled to hire low-grade men and try them out. Some prove to be good men and are promoted. Automobile mechanics generally lack knowledge of new construction of cars, most of them not "reading up" on new parts of later models. There is a great demand for good mechanics and great opportunity for advancement to the man who is ambitious and will study.

The assistant foreman takes care of the work when the foreman is busy or not on duty. What applies to the mechanics, as just stated, also applies to him.

The foreman usually has been promoted through the ranks and should have the knowledge and skill of all the men under him. He is 25 to 40 years old, works as many hours as he sees fit to make his shop pay, and is paid \$25 to \$40 a week. Some keep up with the times on new construction, but most do not. All, in general, need more technical knowledge. The foreman must be able to handle men, estimate jobs, and keep customers satisfied. The industry is hampered for the want of good foremen.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS OF SURVEY COMMITTEE.

Employers and employees engaged in the automobile-repair business are agreed that the following statements are true:

1. The repair business of Minneapolis not only is extensive, but is growing so rapidly as to insure a promising field of employment for an increasing number of new workers each year.

2. The wages paid to workmen in the business and the opportunities presented for advancement into desirable and permanent positions at a high wage make automobile repairing one of the best lines of employment in the city to which the attention of first-class men should be directed and for which training should be given.

3. The automobile-repair business is of such recent development, and changes and improvements in machines and devices are being made so rapidly, that only comparatively few of the workers in this business have either the long experience or the technical knowledge which the highest success of this important business demands.

4. What seems to be needed are courses giving young men who desire to enter the automobile-repair business a chance to get some preliminary experience in this work and training in the technical subjects bearing on it; evening courses which will give the automobile mechanic an opportunity for further practical instruction in the repair and operation of automobiles, together with an understanding of the theories lying back of their operation. Such courses would also be of value to the skilled mechanic desiring to enter the business. Part-time and evening classes dealing with the theoretical side of automobile work should also be provided for those already employed in the business.

As a result of the survey both day and evening courses for the training of workers for the automobile industry were approved by 34 of the largest employers, who agreed to employ the students coming out of the two-year day course in repair and construction at the Dunwoody Institute at an initial salary of not less than \$2.25 a day. A description of this understanding is to be found in Chapter XXIII.

Courses of study for both evening and day classes were drawn up, approved by the trade, and are now being taught in the Dunwoody Institute.

SHEET-METAL INDUSTRY.

The sheet-metal industry is increasing rapidly in Minneapolis. While the United States Census of Occupations for 1910 reported 47 firms in the manufacture of copper, tin, iron, and steel sheet-metal products, the industrial survey made by the Minneapolis Civic and Commerce Association in 1914 showed a total of 64 firms, the number of workers rising in the five years from 472 to 689, a gain of 46 per cent. Of the 64 firms, 21 manufacture copper, tin, and other sheet-metal products; 5 do blowpiping and ventilating work; 6 make corrugated culverts; 19, cornices, steel ceilings, and skylights; and 3, iron and steel doors and shutters.

Most of the firms specialize in some class, and no one firm does all or even very many different classes of sheet-metal work.

There is no particular risk or strain on the inside sheet-metal worker. The usual precautions are used in safeguarding machines and the worker is not exposed to dangerous parts. While some machines, like the cutting and rolling machines, are open, the men soon become accustomed to them and few accidents occur. The outside sheet-metal worker is in more danger, as he works on scaffolds and roofs.

The casualty rate is 88 cents per \$100 of pay roll for inside workers, which is the same as that for machinists, and the trade ranks eleventh from the highest in risk. For the outside sheet-metal worker the rate is \$3.99, and the trade ranks third from the highest in risk. This chapter deals only with the inside man.

The hours of work for the inside sheet-metal trade range from 8 to 10 a day. A few firms arrange for Saturday afternoons off. The trade is not well organized. Boys enter as apprentices from 16 to 18 years old. Some men 60 to 70 years old are found, but a man is at his best at 35 to 40 years.

The demand for skilled workers is increasing each year. When a man becomes proficient he is usually hired by some other firm or opens a place of his own. Layers-out are hard to get. Most firms take the best man in the shop and help him until he can lay out work alone. The supply of trained workers at present is not sufficient to meet the demand, and the foremen have difficulty in obtaining the right kind of workers.

New workers come from all parts of the United States. Some are foreigners who have been in the United States from 5 to 10 years. Many of these become steady workers. Promotion is slow for most men. It is quite a jump from sheet-metal man to layer-out and a layer-out job is considered the best.

Apprentices are found in some of the firms, but there is no general line of promotion for them. In union shops, the union has one apprentice to five journeymen. They enter as helpers at 16 and four years are required to learn the trade, three as helpers and one as apprentices. They are paid 30 cents an hour for the fourth year.

Apprentices are used in the unorganized shops and are paid \$7 to \$14 a week. They work the regular hours, remain as apprentices for about two years and are then promoted to sheet-metal workers. Their wages are increased in the two years, at the end of which, with some exceptions, they draw the same hourly wage as sheet-metal workers.

The common deficiencies of workers are lack of general education, shop training, drawing, mathematics, blue-print reading, and speed.

The method of hiring and basis of retaining workers varies with different firms. Some have employment bureaus, but usually a man is hired or rejected because of his appearance. The man for outside work must be able to climb about on roofs. All men are hired by the try-out plan. There is no regular line of promotion.

A helper may be promoted to machine man, a machine man to sheet-metal man, and a sheet-metal man to layer-out, depending on the firm in which employed.

Most sheet-metal plants are divided into a number of departments. These vary according to kind of sheet-metal work done, and include the blacksmith and machine, door, window, sheet-metal, welding, corrugated culvert, and radiator departments. Only the sheet-metal and welding departments are considered here.

SHEET-METAL DEPARTMENT.

In this department all kinds of sheet-metal work are done, including general repairs, cornice work, and work on automobile fenders, pipes, and tanks. Apprentices, helpers, sheet-metal workers, automobile-lamp repair men, and a foreman are found here.

There are from one to five apprentices in each sheet-metal department, depending upon the size of the plant. They go in when 16 or 17 years old and are paid about 20 cents an hour. The longer they stay and the more willing they are to learn, the higher their wages. In two or three years they receive journeyman's wages, or 40 to 50 cents an hour, and are then termed sheet-metal workers. They do general helping, such as handing tools to the sheet-metal worker and helping on the machines. A good, active body, common sense, and a fair education are required. Knowledge and skill come with experience.

Many apprentices lack common education and are poor in arithmetic. They are usually sons of sheet-metal workers or their friends. They are selected by the foreman and given a trial. No special training is given the apprentice.

From 5 to 15 helpers are employed in the sheet-metal department. They are general helpers, who hold sheets of metal at machines and help assemble and rivet. An active body and common sense are all that is required. The helper usually lacks general education in drawing and mathematics, without which chance for promotion is slight. Helpers may be promoted to sheet-metal workers. They are usually 19 to 40 years old and at their best at about 35. They are paid 25 to 35 cents an hour and are given no special training.

Each plant employs from 6 to 20 sheet-metal workers, depending on size of plant. Not many are promoted. The next jobs in line are layer-out or foreman, of which there are only one or two in each plant. In one plant studied six men were dropped and six hired in one year, no promotions being made. These men are 21 to 60 years old and are paid 35 to 50 cents an hour. They do the forming of all kinds of sheet-metal work. In some shops they assemble parts. They make automobile fenders, hoods and elevator pipes, and ventilating pipes for mill elevators. This requires cutting and bending.

The foreman is usually a better class of worker than the machine man or helper. He has probably been a sheet-metal worker. He does the figuring of the metal and sets the machines to make proper size pipes.

He has to read blue prints and lay out work and must be active and willing to work. He usually is 35 to 45 years old and is paid 42 to 55 cents an hour, or works on piecework as machine man and helper. His deficiency is lack of training in blue-print reading and mathematics and of ability to handle men and plan work.

WELDING DEPARTMENT.

Where a sheet-metal firm is large and does much specializing or specialty work, it usually has a welding department. The welding is done here by the oxyacetylene process, which is used more each year. Many water tanks for tractor machines and gasoline tanks are now welded instead of riveted and soldered as formerly. Helpers and welders are found in this department.

From one to four helpers are employed in each plant where the welder's outfit is used. The helper may be promoted to welder, but promotion is slow, as it takes some time to become a good welder. Helpers are usually 21 to 30 years old and are paid 25 to 35 cents an hour. Activity and common sense are the requirements. Men come and go, probably 15 or 20 men being hired in a year in each plant. Some good workers stay and are promoted.

From two to six welders are found in each department. Few are dropped and one to three are added each year. They are 25 to 38 years old, and are paid 40 to 60 cents an hour. They weld gasoline, water, and oil tanks with acetylene gas and oxygen. A strong body, good eyes to stand the bright light, and common sense are needed.

A good welder must know how to read and write and figure material. Much skill is required in handling the torch, as metal can be burned easily and crystallized if not properly handled.

Much could be done for these men by giving them theoretical instruction and practice in welding different metals. New workers are selected by the foreman and tried out. They are not given any special training.

A fair education is required, as the sheet-metal worker must read, write, and figure and be able to read blue prints. Some are unable to read detail drawings. Much knowledge about forming and handling sheet metal is necessary. All first-class sheet-metal workers are able to draft their work to some extent.

Considerable skill is required to produce neat, clean work. Mathematics and blue-print reading can not be acquired on the job, and some have been unable to get this outside the shop.

Sheet-metal men are hired from other shops, some from small shops in country towns making the best workers. They are selected and tried out by the foreman or superintendent. No special training is given them.

Some sheet-metal firms have an automobile-lamp repair man, a sheet-metal worker who has specialized in this line. What is said of a sheet-metal worker applies to this man also. When not at work on automobile lamps he works on sheet metal.

A foreman in a sheet-metal department is usually an advanced sheet-metal worker of the more progressive type. In addition to a superior education, he is able to read blue prints and figure the job. He directs all the work in this department and is general foreman. He usually has natural ability to handle men, and the knowledge and skill of the men under him. He is 35 or 40 years old and is paid 50 to 60 cents an hour. Some are paid by the week at the rate of \$25 to \$50.

SUMMARY OF THE SURVEY STUDY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

The survey held a number of conferences with an advisory committee for the sheet-metal trades. The employers and employees on this committee represented, as a whole, both the inside and outside work for these trades. Attention is here called to the treatment of sheet-metal work as it is given in Chapter VI on the building trades. At these conferences there was practically unanimous agreement on these statements:

1. The sheet-metal business is growing very rapidly in Minneapolis and the demand for workers, particularly for layers-out, is on the increase.

2. Apprenticeship has failed as a means of preparing new workers for the trade. There are only 10 apprentices with all the shops and building contractors of the city.

3. At present most of the really skilled workers in the business come from outside the city.

4. Sheet-metal work, particularly as it is carried on as a part of a manufacturing business, has become highly specialized.

5. Most of the workers in sheet metal perform some one or, at the most, a few simple hand tasks; or, as is much more frequently the case, operate some special machine which does the work formerly done by hand.

6. In either case, the task which these workers are to perform has been carefully laid out in advance by the layer-out or sheet-metal draftsman and by the foreman. So far as their present work is concerned, there seems to be but little which the school could teach them. This is probably true of most, if not all, of the workers employed as helpers of all kinds—cleaners, doormen, machine men, window workers, and so on.

7. The actual manipulative skill required in the use of tools by the sheet-metal worker does not, in most instances, at least, rank

very high as compared with that demanded for some of the other skilled trades, such as in the case of the machinist, carpenter, and cabinetmaker. This skill can readily be acquired in course of time through the routine of the shop.

8. The trade does make very high demands as to technical knowledge, however, upon the apprentice or any other worker who expects to rise to the better positions in the business; upon the sheet-metal worker in the small shop who must do all his own figuring, laying out, and planning, such as the automobile-radiator repair man, the journeyman in the small business, the cutter in the window department, and the sheet-metal worker in the general repair shop; upon the sheet-metal journeyman in the large shop, particularly where all kinds of work are done; upon the layer-out, who is really in a sense the designer of work, as he lays out in detail for different jobs the way in which the metal is to be cut, shaped, and assembled; and upon the foreman of the plant.

9. Every worker in the sheet-metal business who expects to draw the wage of a first-class man or rise to a responsible position must have a fair knowledge of geometry and drawing, as they are indispensable aids in the trade. Yet, at present, many of the journeymen in the trade are unable to read blue prints, either as to general directions or as to taking off the quantities represented on detached drawings. They are entirely dependent upon the foreman and the layer out for the "headwork."

10. The mathematics and drawing for the sheet-metal worker are so closely related and so dependent one upon the other, that a course in either subject must necessarily involve instruction in the other subject at the same time. So far as evening classes for those already in the trade are concerned, instruction in sheet-metal drafting seems to be the course which will best meet the situation. Such a course makes large demands both upon the previous experience and the ability of the worker student. The basis of such a course is pattern drafting or development of surfaces represented first by the various geometric solids, both alone and in intersections, followed by various practical examples of such problems as represented by actual commercial forms.

11. Both employers and employees recognized that the failure of apprenticeship either to supply promising new workers or properly to train them makes desirable not only part-time and evening classes for those already employed, but also day classes for those desiring to enter the trade. The same general plan for these day classes worked out with other trades for a two-year course of training, including placement in the trade at the wage paid to apprentices in their third year, was tentatively approved. Inasmuch as the Dunwoody Institute was unable, because of the lack of facilities at present, to estab-

lish such day classes, no arrangements for such classes have as yet been developed.

THE FOUNDRY.

Because of the wide variety of work, no one foundry in Minneapolis can be said to be typical in organization and methods. As only one plant could be studied, one of the most progressive and prosperous shops in the Northwest was taken, which, though larger than the usual foundry and therefore not typical as to size, does a wide variety of the work commonly turned out in the city.

The foundry stands as to risk from accident midway among the 19 men's trades studied. The casualty rate is \$1.76 for \$100 of payroll, the business ranking in risk just below steam fitter and ornamental-iron erector (\$2.63) and above the workers in flour mills (\$1.68).

All the workers in the plant studied are hired by a labor agent after examination by a physician and approval by the foreman of the department.

The organization of this foundry, which is only one division of the concern, consists of a foreman, assistant foreman, time and material clerks, boss of machine molding and workers under him, boss of scrap molding and workers under him, boss of machinery molding and workers under him, and boss of ornamental molding and workers under him.

In this report the work will be described under three general heads: Molding, the preparation of the mold for pouring the metal into it; casting, preparation and pouring of the metal; and cleaning, preparation of the casting for market.

MOLDING.

In molding are employed helpers, core makers, machine, snap-flask machinery and ornamental molders, apprentices, and bosses for each group.

The helper carries floor boards and flasks between the foundry and storage yard; helps close molds and weigh molds; helps the molder pour molten iron into the mold; and sweeps and cleans up after each casting. The worker must be a large, able-bodied man, who can stand the heat. He must have initiative to advance. No knowledge of a general kind or about the job is necessary.

Willingness to obey orders and instructions are the most desired requisites. Workers are hired by a labor agent who keeps in touch with local workers. They are subject to a physician's examination. On account of the danger all workers in the structural-iron department are required to speak English, but this does not obtain in other departments. No special training is given helpers until they are to be made snap-flask or machine molders. Ability and efficiency

always bring promotion with better pay. Wages vary from 15 to 25 cents an hour.

The core maker makes cores out of "core sand." Core sand is a mixture of sand, flour, and molasses. A core is a separate part of the mold inserted to shape some part of the casting. After being prepared by the core maker the core is first baked in an oven to make it hard and then turned over to a machinery, machine, or ornamental molder for use as a part of the mold he is preparing. Some core makers become molders. The wage rate is about 22 cents an hour.

Cores are of different sizes and shapes, such as slabs, cylinders, cones, frustrum of cones, and various crooked and intricate figures. Boxes are provided to produce the desired shape. The worker packs the core box with the core sand. With a straight stick he strikes off all the sand above the edges of the box, then lays a baking plate of steel or cast iron across the top of the core, which is held tight to the box. The whole is turned over and the bottom plate lifted, leaving the core ready for the oven. Complicated and intricate cores are made by pasting together cores of different shape. The core maker uses a molder's trowel to "smooth" and "patch" the cores. A narrow piece of steel with one end bent the flat way to form a foot and called a "lifter" is used to patch places which can not be reached with a trowel.

The refinements of molding are developed only by months of practical experience. This can best be gained on the job.

The machine molder is the leader of a gang of four workers who operate a molding machine. Two of these work on the machine; the third does the finishing. All of the gang, including the molder, have been promoted from foundry helpers. The molder is paid 22½ to 45 cents and his helpers 15 to 25 cents an hour. The work of the machine molder is learned more easily than that of any other molder and calls for less initiative and skill.

The molder uses compressed air from a hose to blow any sand from the pattern, then dashes parting sand over it. The helpers place a "drag" upside down over the pattern, the drag pins entering holes provided in the machine table. This drag is a flask or box of wood, cast or wrought iron, with sides only. The molder riddles sand while helpers shovel in enough to cover the pattern. After this the helpers heap the flask with sand, which the molder tucks and spreads with his hand, then moves a lever, causing the sand to be "jolt rammed."

The sand is swept off; a little soft sand is scattered over the surface; "floor boards" are placed on the bottom and top of the drag; and clamps extending over the machine table, drag, and floor board are applied. The molder by another lever raises the table high enough to turn half over, the helpers pull an extension of a work-table under the drag, which is lowered upon it. The clamps are

removed and the drag moved clear of the machine to a long table holding a number of molds for the worker. He finishes them by patching any defects, then attaches a bale from a traveling crane and directs the crane man where to place the mold on the floor.

The snap-flask molder should be strong and quick. The necessary skill and knowledge is acquired in as little time as a month on the job. The workers are selected from helpers by the foreman, who turns them over to the snap-flask molder boss for instruction. The snap-flask molder is paid on the piecework basis, his wage varying from 22½ to 30 cents an hour.

The operation in snap-flask work is nearly the same for all work, as in machine molding. As the worker puts up for many days only one pattern, he can become very efficient. All he needs to know is how hard to ram the sand. Manipulative skill is acquired by repetition, thus requiring only imitative ability.

The machinery molder's work consists of molding and pouring odd jobs not large enough to put on the machine or to specialize. He also does experimental and development work, such as jigs and fixtures castings, patterns for which are often merely an outline. The molder "cuts" or "sweeps" the balance in the sand. The wage rate is 25 to 30 cents an hour.

Pieces of odd patterns may be used to form a few parts of the mold, while the balance is cut out of the sand. The molder also makes crank cases for motors from a two-cylinder opposed to a six-cylinder vertical type, steam engine bases, fly wheels, gas-engine cylinders, and all the small parts of a steam or gas engine.

A molder should have good health and generally does. The "all-round" machinery molder should have native ability, patience, and pride in his work, thorough knowledge of molding methods, and ability to work out the refinements of his art. Skill may be anything from manipulating tools to overcoming in the mold defects in the casting and in the pattern. Knowledge and skill are in 99 out of 100 cases acquired in the shop.

Many machinery molders have been helpers, and the rest apprentices who have served their time in smaller shops. The machinery molders are given no special training. Superior ability and efficiency are rewarded with better jobs, more money, or both.

The ornamental molder makes ornamental ironwork, including stair treads, stringers, newel posts, sash, mullions, brackets, sills, balusters, grills, clusters, and faciers. This is mostly light-finished work and is in some ways the most difficult of all molding work. Like high-grade machinery castings, it requires a smooth, clean surface and correct temperatures of iron for different kinds and weights of castings and different methods of pouring. Constant practice and long experience alone bring efficiency. Wages are 35 to 40 cents an hour.

The apprentice is seldom found in Minneapolis foundries, only one being in the plant studied. Sons of employees are given preference. In general the period of apprenticeship is four years and the pay 10 cents an hour for the first year, 15 for the second, 20 for the third, and 25 for the fourth.

The work of the apprentice starts with the core room, where he is engaged for about a year with the core maker in making and baking cores. He then goes to the molding floor to work for the rest of his apprenticeship under a machinery molder. He first learns to cut over or prepare sand previously used; to temper it by adding new sand to give it strength to stand up or support itself; and to mix a scavenger or cleaner, called facing, with "molding" or "green sand" in proper proportion for different sizes and classes of work. He then helps the molder to "put up" or prepare all the different kinds of molds and thus gains knowledge and skill.

The bosses and foreman for the molding department are men of long practical experience who have risen through the ranks. In this and most other plants in the city these supervisors have considerable practical knowledge as to foundry processes. What seems to be most lacking is familiarity with the best principles and practices in systematizing foundry work and an acquaintanceship with the construction, operation, and adaptation of various types of foundry apparatus. Not more skill in shaping molds but more business and technical knowledge is the greatest need of foremen and supervisors.

CASTING.

In the casting work, helpers, crane-ladle men, cupola chargers, cupola tenders, a cupola-tender boss, and a chemist are employed, their wage and importance being in the order given.

The helpers in the cupola gang shovel slag and cinders from beneath the cupola and wheel them to the iron washer where the iron and cinders are separated and then wheeled from the washer. The helpers also sift cinders and do general helping. The wage rates are 20 to 25 cents an hour. The work requires no education or training.

The crane-ladle men are taken from the helpers. They sweep gangways and keep them clear; shovel sand in a powder riddle; mix facing with molding sand; carry flasks to and from the yard; carry cores from the core room to the molders; and operate the crane ladle. A ladle is an iron kettle lined with clay, used to carry melted iron from the cupola to the mold. Ladles hold from 80 to 200 pounds of metal, according as they are used by one or two men; and up to 50 tons when carried by a crane or on a track. The large ladles are tilted for pouring by a geared mechanism operated by the crane-ladle man. The iron is poured directly into the mold if it is large enough. Otherwise it is first poured from the by-ladle into a hand

ladle and then repoured by the molder, who always pours on his own work. The wage rate is 20 to 25 cents an hour. No qualifications are required other than strength and extreme carefulness.

The cupola chargers load, weigh, and deliver to the charging floor the different "charges" of coke, pig scrap iron, and other materials used for the "heat." A "heat" is either the total act of charging, heating, and drawing the metal from the cupola or the total quantity of heated metal drawn after one charging. First a fire is built of wood, then a charge of coke is forked through the charging door, followed alternately by charges of iron and coke, those of coke becoming smaller as those of iron become larger. A chemist specifies the quantities for each charge. The rate of wages is 20 to 25 cents an hour. The cupola charger must be strong and know how to read and write; must understand figures well enough to read them on a scale, and be able to add up to forty or fifty thousand. His work requires no other training.

The cupola tenders are recruited from helpers, ladle men, and chargers. With a pick they remove iron slag and mud from the fire-brick lining of the cupola and cover thin spots of the lining with thick, stiff clay mud. They also mud up all the ladles and dry them out with a light, slow wood fire. They put up the bottom cupola doors, put in a bottom for the cupola made of dry sand and dry-sifted cinders which tapers slightly from the back to the spout in front, lay the fire, and put in the "breast." The breast is an oblong opening in the shell of the cupola extending from the spout upward which is mudded up after the fire is laid.

The tapping hole in the lower part of the breast is formed with a bar which is removed when the breast is set. The melted iron runs out of this hole, which is stopped between pourings by thick clay stuck on a disk at the end of a stopping bar. The mud is pushed into the hole and held until it hardens. A pointed bar is used for reopening or "tapping" out the hole. The cupola tender must report all iron and coke used. Wages are 25 to 30 cents an hour. The only special qualification for this worker is that he must be careful and painstaking.

The cupola-tender boss comes out of the ranks below him. He directs the work, instructs the men, and helps them when necessary. When the cupola is relined he lays the fire brick. The wage rate is 30 to 35 cents an hour. He must have ability to direct men and make economical repairs. His chief skill consists, however, in laying the fire brick. This can be learned only on the job.

The chemist makes chemical and physical tests of the product from test bars cast with regular castings. From the results he specifies the cupola charges. He also analyzes the coke, iron, and alloys before they are ordered and after delivery. He must have technical

training. Only the larger foundries employ chemists, others work by the "method of trial and error."

CLEANING.

In the cleaning department are employed helpers, chippers, a sand-blast man, a crane man, and a gang boss.

The helpers in the cleaning department are recruited from foundry helpers. The wage rate is 20 to 25 cents an hour. They knock cores out of the casting by jarring it with a hammer. Sometimes they drive a bar into the core to make a hole through the casting, then worry the balance out and scrape the hole clean with a bar or file. They brush the sand from the casting with wire brushes, grind the castings on an emery wheel, and help load and unload rattlers.

A rattler is an iron box or barrel, with a hinge or bolted plate for a door and an axle or shaft in the center of each head on which it revolves. When filled or "loaded," the castings rattle against one another, thereby cleaning the sand from them.

Helpers also carry and truck castings. They must be husky, willing workers and have respect for authority. The work is easy to learn.

The chipper lifts castings to a bench, chips off the rough places with a hammer and chisel or with a pneumatic chisel, and loads them on a truck or car. The wages are 22½ to 25 cents an hour. The work requires strength and patience, but no particular knowledge or skill except to handle a hammer or chisel, which can be acquired in 5 to 15 days.

The sand-blast man is taken from the helpers and is paid 25 to 30 cents an hour. He rolls castings into position and cleans them with a sand blast. Clothcd in a dust-proof suit, he holds a nozzle which emits sand, impelled by air at about 80 pounds pressure, both air and sand being controlled by the worker. The sand cleans the casting. The sand blast is used only on heavy castings or those difficult to clean. It is a hot, dirty job, but requires no educational qualification.

The crane man is also taken from the helpers and receives 25 to 30 cents an hour. He operates a lever which, pushed from a central position in one direction, causes the crane to move on a track. When moved past the central position in the opposite direction, it reverses the movement of the crane. Another lever operated in the same manner causes the carriage to travel lengthwise of the crane. Still another lever causes a block from which ladles or castings are hung to move up and down. The crane man also operates a brake by foot levers.

He does no repair work, and takes orders from the man on the floor. He oils all the machinery of the crane. Great strength is not

needed, but he should have good health and not be subject to any disease which might cause him to lose control of the machine. He should be alert and have good eyesight, and must obey orders exactly. A few days only are required to learn to operate a crane.

The gang boss comes from the helpers and is paid 30 to 35 cents an hour. He supervises the work and teaches the workers. With the crane he moves the castings about the department. A chain or a rope sling is attached to the casting and then attached to the crane hook. The gang boss then signals the crane man where and when to move. He is usually a rough boss carrying out the orders of a foreman. Only a general knowledge of the workings of the shop and ability to handle laborers are required.

SUMMARY OF THE SURVEY STUDY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

No conferences with employers or employees in the foundry business were held by the survey. It was felt that a foundry equipment would be necessary to teach either the practical or the theoretical side of the business, and there was none available at that time nor was there any prospect of obtaining such facilities. The general opinion of the trade seemed to be that it would probably be better to let the whole question rest, at least until the plans of the Dunwoody Institute for its own shops had been matured.

The foundries need the aid of trade and technical education very much. This applies to almost every class of worker and every phase of the business. In fact, it is openly admitted by practically all those in the business.

Very few foundries have their materials analyzed before going into the cupolas, and many never have any tests of the finished product made unless so required by a customer as a condition of contract or of purchase.

Owing to a lack of knowledge on the part of superintendents and foremen, defective scales, careless and ignorant workers, and lack of proper systems of cost estimating and cost accounting, many foundries can not tell within 5 to 15 per cent the cost of taking off a heat. The only method of guessing is to add up all the money spent in a given period and compare the sum with the total amount received for the work.

Some of the foundrymen, though they are very much in the minority, are openly opposed to the idea of education for the worker, holding that molding, after all, is a matter of shoveling and pounding sand and that special training will put "kid glove ideas" into the heads of the workers. Others scorn the idea that efficiency can be taught by any other than thoroughly practical workers. While this is very largely true, the trade as a whole is agreed that the

chance for improvement is so great in this industry that an expert in cost accounting or foundry management or metallurgy could make some really big improvements. One of the most striking evidences of the present conditions is the practically universal statement of the trade that there are very few men in Minneapolis with the knowledge necessary to teach a class of foundry foremen.

The foregoing description shows that foundry work, like all the other trades studied by the survey, has been changed, so far as conditions would permit, from hand to machine processes, though, because of the very nature of the trade, the molder still performs more tasks by hand than most other tradesmen. Along with this change has come the inevitable corresponding change in the organization of the foundry, whereby the great body of the workers of all kinds, from helper to molder and cupola tender, have been organized into groups performing set tasks where manipulative skill is required, and directed by foremen and bosses who are supposed to train the men in their work, direct their labor, systematize the processes of the plant, and furnish the expert technical knowledge so much needed. The unfortunate thing is that, due to lack of training, many of these leaders are not able to measure up to their responsibility. As a result the business and everyone concerned with it suffers.

These conditions, which are typical in a large sense, together with the recent rapid growth of the industry, indicate that the foundry business not only offers opportunities, but needs the provision for an all-day course carried on in conjunction with a typical foundry equipment. The combination should provide opportunities for the more ambitious and far-sighted workers in the business to obtain the scientific and technical instruction involved in efficient cupola practice, as well as understanding and familiarity with the construction, operation, and adaptation of the various types of apparatus used in machine molding. Such a course, which might be limited in time to one year, would in all probability draw from the State as well as from the city of Minneapolis.

CHAPTER IX.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR THE WOOD TRADES?

The woodworking industry of Minneapolis comprises many small plants, classified as follows: (a) Lumber; (b) house furniture; (c) sectional furniture; (d) office, school, and church furniture; (e) furniture frames; (f) store and office fixtures; (g) office desks; (h) interior cabinetwork; (i) show cases; (j) bank and bar fixtures; (k) refrigerators; (l) sash, doors, frames; (m) boards, ladders, step-ladders, and various other wood specialties; (n) cigar boxes; (o) burial cases; (p) boats; (q) barrels, tubs, and pails; (r) farm wagons; (s) carriage bodies; (t) wheelbarrows and farm machinery; (u) bookkeepers' supplies; (v) hardwood flooring, moldings, and tanks; (w) weather strips; (x) artificial limbs; (y) pattern making.

The foregoing represent 109 establishments and 5,233 workers.¹ Several establishments produce only one or two standard articles, while some of the larger ones produce a number of lines.

In the manufacture of lumber, Minneapolis has lost its former position of first rank 25 years ago. On the other hand, the use of lumber in various lines of manufacture is on the increase, especially in office furnishings, store fixtures, sash, doors, and frames, and interior cabinetwork for houses.

There is very little physical or nervous strain involved in the industry, and if a man's health is normal on entering no detrimental effects are likely. Liability to serious accident is not great, as woodworking is ranked by the casualty companies twelfth from the lowest risk among the trades studied by the survey.

Foremen are usually employed on the weekly basis of 58 hours, and most other workmen on the hourly basis of nine to ten hours for inside work and eight hours for outside. Wage rates range from 10 cents an hour for boys beginning as helpers to 50 cents for expert machine operators and high-class cabinetmakers. The prevailing rate for machine operators is \$2.75 to \$3 a day of 10 hours, and for cabinetmakers (working inside) \$3 to \$3.25. There are two slack seasons, one in January and February and another in June and July, during which much of the cheaper help is laid off.

The large majority of cabinetmakers are foreign trained, averaging in age about 45 years. The machine hands are most Ameri-

¹ Minneapolis Civic and Commerce Association's Industrial Survey, 1914.

can born and have picked up their trade in the mills, and average considerably younger than the cabinetmakers. The age of entrance is 18 to 22 years, though a few boys 15 and 16 years are employed on light work, such as clamping and nailing frames in sash and door factories. These boys are said to learn easily and turn out work more quickly than older men. The age of maximum productivity is between 30 and 50 years.

The demand for labor is increasing and at some seasons the supply is inadequate. Establishments increased from 101 in 1909 to 109 in 1914, and workers decreased from 7,053 to 5,233.

In the 17 establishments visited no real apprenticeship system is maintained. Usually new workers are obtained through "try-out" methods.

Occasionally boys are employed as machine helpers and through personal initiative become machine operators, and sometimes foremen. This process is, however, too slow for most boys and after a short time as helpers many quit and present themselves at some other establishment as full-fledged machine operators. Such boys are usually tried out and if fairly successful and promising are retained. By moving from one plant to another, the bright boy is enabled, in a few years, to familiarize himself with several different machines and become somewhat expert.

It is not possible to describe here the manufacture of each wood article produced in Minneapolis and as only one line could be presented, furniture was chosen because it covers practically all processes and occupations found in all the lines.

In the usual furniture factory there are five well-defined departments: Lumberyard (including the dry kiln), machine, cabinet, finishing, and shipping.

LUMBERYARD.

Yardmen are rated as common laborers and, excepting the foreman, require no training other than experience gained in regular routine. The foreman must be able to read and write, handle simple figures accurately, and have long experience in handling and judging lumber. He receives lumber at the yard, sees that it is up to grade, puts it through the dry kiln, and delivers it to the millmen. Though usually an expert in his line, he is rated as a common laborer and receives only about the maximum wage paid for common labor.

MACHINE DEPARTMENT.

In the larger factories there is, with a few exceptions, a man for each machine and each machine represents a distinct job.

For convenience in this report, machines are divided into two classes, general-purpose and special. Crosscut saws and ripaws,

planers, and jointers belong to the former and are used to prepare stock for special machines. Saw operators are known as cutters and usually work in units of three, a crosscutter, a rip Sawyer, and a helper.

The crosscutter receives the lumber from the yardman, cuts it into lengths, and passes it on to the rip saw. In some cases he is regarded as the most important factor in the plant, especially in the manufacture of furniture frames. He must be a good judge of lumber and be able to cut his stock with the least possible waste.

To become a cutter a man must first master the rip saw. From rip Sawyer to cutter is regarded as a promotion, but there is no particular way for a man to reach the rip saw. In this type of plant machine jobs in order of wages are: Sand drums, planer, rip saw, variety saw, polisher-multiple drum sander, boring machines, shaper, and cutter. The last three pay the same wages. Except for the case mentioned, there is no system of promotion from one machine or job to another.

The rip Sawyer receives short-length stock from the crosscutter and rips it to desired widths. He is usually of fair natural ability, but needs no special training other than that readily gained through practice on his machine.

The helper receives the pieces of stock as they come from the rip saw, arranges them in order on a truck, and passes them on to the jointers. He also carts away the waste material.

Any boy of normal mind can readily become a good helper, but the job appeals so little to his intelligence that the bright, ambitious boy will not stay long. For this reason helpers are often boys of the subnormal class, or men too old for more responsible positions.

The planers and glue jointers each require a chief operator and a helper. The operator must understand his machine, be able to adjust the knives properly, and keep all parts in running order. He must also know his material and how to put it through the machine to get best surface results.

The helpers for these machines are of about the same type as those in the Sawyer group, and the planer helper's duties are exactly similar. The glue jointer's helper has a slightly different but no more difficult job. He sits or stands at the tail of the machine, receives the pieces of lumber as they come through one side, turns them over and feeds them back through the other side, a sort of automatic process requiring little mental or physical ability.

A complicated type of machine known as the Linderman dovetail glue jointer is found in a few factories. This usually requires a crew of four men, a chief operator, two feeders, and a Sawyer. The operator must be something of a mechanic to get the best results.

He must keep the machine in good working condition, start and stop it, and as the joined pieces are automatically ejected catch and pass them to the sawyer.

The sawyer trims these pieces to the desired width, piles finished parts on a truck, and passes back to the feeders all scraps worth saving. His job is about on a par with that of the general rip-sawyer. The feeders sit, one at each end, and feed the pieces into the machine. The physical and mental requirements are very slight. The main responsibility of these men lies in attention to business.

The molders, shapers, scroll and dado men, operators of tenoning and mortising machines, sanders, and polishers are men of larger experience and greater skill than those already dealt with. Most machines of this highly specialized group are capable of very delicate adjustment, and the man who can keep all the parts in perfect working order gets the best surface results, and effects the greatest saving in labor and material.

One of the greatest shortcomings of the machine man is his lack of general knowledge of processes in the manufacture of a complete article. Knowing only the one or two processes assigned to him, he is likely to leave much to be done by the slow process of hand scraping and sanding in the finishing department, which might have been done more easily on the machine.

CABINET DEPARTMENT.

The cabinetmaker's trade has changed greatly with the development of machinery. Most of the work formerly done by hand is now done by machinery, and the cabinetmaker in the average factory is little more than an assembler of parts. The work is so thoroughly subdivided and specialized that no man completes anything. For example, in building a chiffonier, one man does nothing but assemble ends, the parts of which have been finished by the machine men, another sets up the framework, another assembles drawers, and another fits drawers. Such workers can hardly be called cabinet-makers, as it takes a number to make a piece of furniture.

A much higher type of cabinetmaker than the one just mentioned is engaged in building and erecting high-class cabinetwork in churches, offices, stores, banks, and dwellings. Because they construct complete units from special designs, they must have greater skill and intelligence than the class first mentioned. This work is largely done by foreign-trained workers who learned their trade by the old-time apprenticeship method and are highly skilled through years of practice. The supply of these workers is rapidly falling behind the demand and must continue to do so until better training is provided for native-born workmen.

It is generally conceded by manufacturers that the situation is becoming serious, but so far they have made no noteworthy effort to discover and apply a remedy. The apprenticeship system, they say, is no longer practicable, because the American boy will not work three or four years for his board, or less, while learning his trade.

To get wages from the start employers insist that he must earn them. He is, therefore, put directly on a job with no help, except an occasional suggestion from the foreman. No time is set aside for special instruction and no one is responsible for giving it. As a result, the industry is being filled with untrained workers, few of whom rise above mediocrity.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

A general view of the woodworking industry of Minneapolis seems to indicate that there is very little demand for training of either general or special character for young workers because the number of workers needed for skilled positions is small. Employers say that the more "schooling" a boy has the less desirable he is as a factory hand because he is less likely to stay with the job.

The average high school boy, they say, places too high a value on his ability and is not satisfied with the low initial wage offered to beginners in this line of work. Consequently he does not stay long enough to become of any value to the establishment. For this reason they look to the grade schools rather than the high schools for recruits when in need of cheap labor.

As regards special training of a character designed to prepare the boy for his job, some employers are doubtful as to whether such training can be given successfully anywhere outside the factory itself. On the other hand, no establishment in this city has made any adequate provision for giving such training. The general policy has been to rely upon the foreign-trained workmen for practically all the expert service, leaving the less desirable jobs to the home-trained, or rather, untrained workers.

To one who has taken some pains to observe present-day tendencies in industry, such a policy brings forward serious questions. It does not require an expert to see the probability that the supply of foreign-trained skilled labor will very soon be far short of meeting the demands of the industry. In this event it would seem that the only possible source from which to draw recruits to meet this deficiency would be from among the less-skilled workers already employed in the factories. This fact, serious enough in itself, becomes still more serious when one considers that these men, as pointed out, come from the ranks of the grade schools—and not only

that, but from among those of comparatively low mentality. If a boy remains in the grades until he is of lawful age for work, it is because he is at least two years below normal.

The inevitable results of a long-continued pursuit of this policy are not difficult to imagine, and unless some effective remedy is applied soon, one may expect to see in the immediate future a marked lowering of general intelligence and skill among workmen and a corresponding drop in the quality of the output.

The fault seems to be nobody's in particular and everybody's in general. The trouble lies in the fact that the interests of the two dominant forces among the people of every community, the public schools and industry, have become divorced, if indeed they were ever united. The schools have been slow to recognize the requirements of industry and, on the other hand, industry has failed to acquaint the schools with its needs and demand that they be adequately met. The woodworking industry of Minneapolis apparently has long since concluded that the schools could do nothing for it, and now it appears to be rapidly approaching the stage where it can do little or nothing for itself. With the increasing demands for its product and the rapidly decreasing supply of skilled labor the situation promises to become acute, and the more thoughtful and farseeing employers are beginning to look seriously for a remedy.

The remedy seems to be in the bringing together of these two forces and welding them, as it were, so as to make the heretofore separate interests of each the common interest of both. The schools, on the one hand, must study the industry and find out its needs. Industry, on the other hand, must make clear to the schools what its needs are and cooperate with them in devising definite plans to meet them. This will involve a radical change in the policy of the schools and definite provision for putting this policy into effect. It will also mean an entire change of front on the part of the industry. It is an interesting sign of the times that this very change, in large measure, has already been realized in Minneapolis, and the schools and the industry seem destined to work hand in hand, making a common cause from this time forward of the interests of both the worker and the employer.

In conditions such as stated, instruction outside the factory can offer to those already in industry opportunities only to the relatively few stronger and more ambitious workers for improving their condition by evening courses in drawing, with special reference to cabinet projection and blue-print reading, together with the calculation and practice in detailing shop orders from drawings and specifications and making out bills of material for them.

As a result of conferences with the trades held during the survey, arrangements have been made, in order to develop a supply of

superior trained workers for entrance into the industry, for the training of boys in the mill room and cabinet shop of the Dunwoody Institute. In this arrangement, which is practically the same as arrangements made for other trades previously described, boys are to be given a three-months' trial in the mill-room and cabinet-working courses to test their interest and fitness. After this they will give the rest of two years of 10 months each to instruction in academic and trade subjects, one-half of each school day to be devoted to trade processes. As the class of the second year they will be placed in the woodworking plants of the city at a beginning wage rate of not less than \$2.75 a day; the diploma of the schools is to be withheld for one year until proof of satisfactory service in the business is presented. The advisory committee of employers and employees is to aid the school in making the training thoroughgoing and successful.

The arrangement has been approved by the employers in the wood trade and by the union. A description of the understanding for all the trades is given in Chapter XXIII (see p. 529).

The above plan seems to the survey committee worth an experiment. Whether any considerable number of boys of the kind that desire to enter the woodworking mills will give up two years to school can only be ascertained by trial.

CHAPTER X.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR THE PRINTING TRADES?

Improvement in workmanship rather than increase in business has marked the printing industry during the last five years. In 1909 there were 1,378 male and 367 female wage earners over 16 years, and including officers and clerks, 3,160 persons were engaged in the industry. In 1914 there was an increase of only 153, the rate of increase, 5 per cent, being the smallest of any industry studied, except the lumber industry. The number of shops increased during the same period from 216 to 253.

The cause of this relatively small increase among printers may be that many large book and catalogue jobs formerly done in Minneapolis are now done in the larger shops in St. Paul. One wholesale firm alone has printed in St. Paul a quarterly catalogue that keeps 25 compositors busy all year, and the two telephone directories are printed in that city. Little of the St. Paul business comes to Minneapolis.

Minneapolis, in contrast with St. Paul, has comparatively small printing plants, no commercial shop employing over 75 persons. The typical large shop employs from 40 to 60, and most of the small shops from 2 to 10, usually about five. The absence of large plants is due partly to the general character of the printing done—there being practically no specialty houses—and partly to the close business relations between some of the larger plants in Minneapolis and the big establishments in St. Paul.

The marked contrast between the two cities in the growth of the printing industry is shown by the following table:

TABLE 11.—RELATIVE GROWTH OF PRINTING INDUSTRY IN MINNEAPOLIS AND ST. PAUL.

Year.	Number of establishments.				Persons engaged in the industry.				Wage earners.			
	Minneapolis.	Per cent of increase.	St. Paul.	Per cent of increase.	Minneapolis.	Per cent of increase.	St. Paul.	Per cent of increase.	Minneapolis.	Per cent of increase.	St. Paul.	Per cent of increase.
1899.....	165	.....	98	.....	(1)	.....	2,206	(1)	1,338	.....	1,410	.....
1904.....	185	12.1	114	16.3	2,697	.....	2,216	0.5	1,501	12.2	1,523	8.0
1909.....	216	16.6	113	(*)	3,160	21.7	3,098	39.3	1,755	16.9	2,065	36.9
1914.....	253	17.1	(1)	(1)	3,313	4.8	(1)	(1)	2,083	18.2	(1)	(1)

¹ No figures available.

² Loss.

It will be noted that, with practically the same number in the industry in the two cities, Minneapolis has nearly twice as many establishments as St. Paul, and that in 1909 there were 330 more wage earners in St. Paul, indicating numerous small shops in Minneapolis, operated in person by the proprietors. In spite of an actual decrease in establishments in 1909, St. Paul showed an increase of 39.8 per cent in number engaged in the industry.

Progress in this industry in Minneapolis seems, therefore, to call for higher standards of workmanship, making training for both present and prospective workers particularly necessary.

The annual volume of business in 1909 was \$6,478,000, printing ranking fourth among the industries studied, it being preceded by the flour, lumber, and metal-working industries.

The conditions of employment are above the average, having greatly improved in the last five years. This is due partly to trade organization and partly to the general movement for better working conditions. Shops are better lighted and ventilated, and more attention given to sanitation. That there is still a health risk, however, is indicated by the fact that seven out of the eight deaths among compositors in the last two years were due to tuberculosis.

The presence of type and paper dust, fumes of molten metal, and odor of chemicals and acids make strong lungs essential for the good health of all entering the trade. Good eyesight and steady nerves are needed by the compositor and pressman, as the work occasions more than ordinary strain. The pressroom is often overheated. There is little hazard, the casualty insurance rate being 63 cents, the lowest for any trade studied, except some of the women's trades.

All the organized and many of the unorganized shops have an eight-hour day. Some of the unorganized shops work 9 hours, and a very few, only four in 1910, 10 hours. In general, the eight-hour day prevails. Workers in daily newspaper shops are limited to 48 hours a week, a "sub" being called in for the seventh day. The work is not seasonal, about 70 per cent being steadily employed throughout the year. The slack season is from June through August. Workers on the "sub" list in newspaper shops work only from two to four days a week, according to "priority."

The supply of trained workers has been kept equal to the demand by the moderate increase in the business and a continuous flow of country printers to the city. It has never been difficult to secure workers since the general strike of the typographical union in 1905, which, however, introduced many green hands into the trades and lowered standards of workmanship. There is always a dearth of job compositors and cylinder pressmen who can do high-class work. Good stonemen are in great demand, owing to lack of promotional

capacity among compositors, due to insufficient trade experience and no adequate system of apprenticeship.

The country printing office supplies this need best at present. Pressmen capable of doing the best grade of work are much sought after. Employers and workers agree that some radically different system of trade training is needed for all who enter the industry if shops are to compete for the better grades of work. The high wages paid in newspaper shops keep the supply of workers considerably ahead of the demand.

The printing trades are generally well organized. The compositors' organization, which includes machine men, proof readers, and foremen, contains 85 per cent of the workers. The newspaper composing rooms are 100 per cent organized, pressmen in job houses 95 per cent, and pressmen's assistants 97 per cent. Newspaper pressrooms are only 50 per cent organized. Although proportionately better organized, the pressmen have no written trade agreement with each shop, as have the compositors. In the matter of wages this is probably due to the greater scarcity of good pressmen, which keeps the average paid considerably above the union scale. The more definite character of apprenticeship possible in the pressroom, practically the helper system, makes it seem less necessary to attempt to chart out and demand a specific course of training.

There are about 65 apprentice compositors, 40 in union shops, with which there are separate agreements governing apprenticeship. Contracts of indenture are not in use. Apprentice compositors enter at 16 and, after six months' trying out, if approved by a board of examiners composed of the foreman of the office, chairman of the chapel, and president of the typographical union, continue through a term of four years, divided, in a job shop, as follows: One year on cases exclusively; two years on stonework; last year on cases exclusively.

Apprentices must take the correspondence course offered by the International Typographical Union during the last year of their apprenticeship and are forbidden to practice on linotype or monotype machines until the last six months. The wages are \$6 to \$8 a week the first year, \$8 to \$10 the second, \$10 to \$12 the third, and \$12 to \$15 the fourth. There is no apprenticeship scale in the job shop.

The quota allowed in the job shop is one for every five journeymen. Many shops do not maintain their quota because it is not profitable. Apprenticeship in open shops is left to custom, dictated, in the absence of a trade agreement, almost entirely by commercial demands. Such shops often have more apprentices than journeymen.

Apprentice compositors in newspaper offices, where the proportion is one to eight, must "be given an opportunity to work in every department of the composing room, and must be employed the last

two and a half years of their apprenticeship on the case and at other intricate work, excepting the last six months of said apprenticeship, which time may be devoted exclusively to work on the linotype or typesetting devices in use in the office." (Agreement expiring May 1, 1918.) "Apprentices shall receive in their third year 40 per cent of journeyman's wages and in their fourth year 60 per cent or until in possession of a journeyman's card." The quota is filled more often in the newspaper than in the job shop.

As pointed out in the analysis of the apprentice compositor's deficiencies and needed training, the apprenticeship system for training compositors has broken down completely, owing to inability of commercial institutions to perform educational service. As one employer says, "We are running a business, not a school."

There are about 20 pressmen's assistants, who are practically apprentices. Eighteen is the age of entrance, and four or five years are required to learn the trade. Wages are \$10 to \$15 a week, the increase being about \$1 a week during apprenticeship. There is no organized system of apprenticeship. The Pressmen's Union admits assistants to apprentice membership after four years in a pressroom and 90 days under "instructions." Full membership is attained when the worker is deemed competent. It means ability to "draw the scale." This overlapping of membership indicates the sharp distinction drawn between those assistants, feeders, who after a 90-day trial demonstrate their fitness to become pressmen and those lacking native ability and mechanical knowledge to become journeymen. Possibility for spoiling an entire job, and consequent responsibility of a pressman in charge of one or more presses, makes more definite the minimum degree of knowledge and skill required of journeymen compositors.

Two apprentices are allowed for four journeymen, and three for seven. Shops generally maintain their quota. The pressman's assistant receives more definite training than the apprentice compositor and is under more direct supervision. He can not help learning something about presswork. The great drawback is the amount of time he is kept feeding when he should be learning "make-ready."

Printing and publishing includes book and job houses, mechanical departments of newspapers, plate making, and lithographing. The mechanical department of a newspaper is sufficiently distinct from the commercial shop in organization and trade practice to attract and retain a different type of workers. It is therefore given separate consideration. Plate making and lithographing are distinct branches of the trade.

The book and job houses of Minneapolis do general commercial printing, such as books, catalogues, advertising folders, blank books, and office stationery, practically all being separate jobs done to order.

There is little specialty work—that is, printing in stock quantities such things as single-line calendars, match boxes, caps, horse blankets, post cards, posters, and law books. The market is local, with the exception of bank stationery and some linotype composition for country papers.

A complete book and job plant consists of a composing room, job and cylinder press rooms, a bindery, and a stock and shipping room. After the job has been contracted for the copy goes to the composing room to be set up and made into forms. The made-up form consists of plates (half-tones, zinc etchings, electrotypes), and of matter set by hand or by the linotype or monotype machines. The form then goes to the pressroom, where the press is “made ready” and the job run through. If stitching, folding, perforating, scoring, or binding is to be done, it is sent to the bindery. The shipping room packs and delivers the completed job.

This process is subject to many modifications, according to the job and the organization of the plant. For example, a blank-book job goes to the bindery for ruling and perforation before the presswork is done and returns for the folding, stitching, or finishing. If the shop is unable to handle a rush of business, the composition work may be sent to another plant. Plate work is sent out to photo-engravers or electrotypers.

BOOK AND JOB COMPOSING ROOM.

The composing room employs errand boys, apprentices, compositors, stonemen, linotype-machine operators, monotype-keyboard operators and caster men, and a foreman. A staff of copyholders and proof readers is essential. In the pressrooms are folding-machine operators, press feeders, apprentices, job and cylinder pressmen, all under a foreman. A bindery employs “bindery girls,” stock cutters, apprentices, finishers, forwarders, ruling-machine feeders, rulers, and a foreman. A shipping clerk and helpers pack and deliver the job to the customer.

The composing room in an up-to-date book and job office presents unfamiliar conditions to one who has in mind the old-time printing office, with its many cases of type, the old-time printer, and the printer’s devil. Linotype and monotype machines have reduced type cases to a minimum and seriously curtailed the opportunities for developing “all-round” workmen. The introduction of the machines and a long dispute between employers and workers in 1905 resulted in many new workers entering the trade with little or no previous trade training.

If it were not for workers from small country shops where complete trade experience is afforded, the supply of trained compositors would be confined to the older men. Specialization, machine meth-

ods, and inability of a commercial institution to cope with educational problems have created new conditions which must be met.

Throughout all the changes and improvements three distinct employments have remained in the composing room—setting up the job, reading proof, and making up forms, minor workers in each case acting as helpers and serving an apprenticeship. Errand boys become apprentices and finally compositors, either hand or machine, and copyholders become proof readers; compositors become stonemen and later foremen.

The greatest need is for compositors with trade experience and education to do the better class of work and take charge of the composing room. The country shop continues to afford a limited supply of this class, but if workmanship is to be materially improved, important changes in trade training are necessary. A description of the duties, qualifications, and educational requirements of each job follows:

Errand boys between 16 and 18 years old are employed in the various departments. They pick type off the floor, put away leads and slugs, wrap packages, and wash rules. There are about 40 in the printing shops of the city. They are used by various departments as required, thus receiving training which serves as a trying-out process. These boys work for about a year at \$6 a week, when they either become apprentices or leave the trade. Ordinary intelligence, ability to read and write, and enough arithmetic to make change and collect, is all they need to know, so far as their job is concerned.

To be promoted to an apprenticeship the boy should have completed the sixth grade to be a successful pressman, and the eighth grade to become a successful compositor. A large majority are not settled as to what they want to do, and after several weeks or days on a job, drift off to another, or try a new occupation. It is the experience of one employer that only 1 boy in 12 makes good. A small wage increase is sufficient to attract him elsewhere.

This is not entirely the boy's fault. The school has given little or no opportunity to find out what is needed for success in the industry and the organization of the average shop places a handicap on his favorable entrance as a learner. The commercial atmosphere into which he is thrown places a premium on ability to obtain a slight wage increase and discounts time taken from his duties for trade training, which would lead to a much greater income. All the facts point toward the need for prevocational courses for boys about to leave common schools and for opportunity to get the first period of training, preferably two years, in a day trade school where commercial necessities do not interfere with systematic training in the fundamental operations of the trade, and further general education in allied branches.

The apprentice compositors, of whom there are 50, are recruited from promising errand boys. They receive \$8 to \$15 a week during the four years or more of apprenticeship. Promotion to journeymen comes as soon as the apprentice can "draw the scale." Although in theory the apprentice is supposed to serve in all departments and have a well-rounded training under the chairman of the chapel or the foreman of the room, commercial demands make this impracticable. Employers and tradesmen agree that the duties of the apprentice are assigned to increase the immediate productivity of the shop rather than provide complete trade experience according to a systematic plan.

Although the duties of apprentices cover a wide range, such as sorting leads and slugs, distributing type, making galley corrections, and helping stoneman, each apprentice is kept at tasks he does best or at work that needs to be done, and has to "pick up" rather than learn the trade. In large shops he learns little about the press-room or binding. He can supplement shop experience through correspondence courses offered by the I. T. U., and in union shops is assessed 50 cents a week for a year to pay for this course, and is supposed to complete it before a union card is given him. In open shops it depends entirely on his own initiative. Experience shows that for most men the correspondence method does not work.

The apprentice should have distinct literary rather than mechanical bent and a good, general education. In the first year he should learn the printer's scale of the point system and know how to distribute type and other materials. In the second year he should learn enough about locking up and killing of forms to be of considerable assistance at the stone, and be able to lock up forms for plate or job presses. In his third year he should be able to set reprint work and "new" work under supervision. In his fourth year he does the lighter work of a compositor and is known as a "two-thirder." Many stick at this point.

The average apprentice lacks education and is indifferent to the demands of the job. The cause and remedy for this indifference has been dealt with in connection with the errand boy's job.

The compositors and stonemen number about 400, including one-man shops. These two jobs are so closely related that in most shops some duties of stonemen are expected of every compositor. A compositor works nine hours a day, eight hours in union shops, at \$15 to \$25 a week. The union scale is \$21 for day and \$24 for nightwork. He is usually 21 to 50 years old, having become a journeyman after four years of apprenticeship or, as often happens in getting a new job, when able to "make the scale." A compositor is the fundamental

productive worker in the room. The better workman he is, the more profitable the job.

He sets up the job from the copy, corrects proof returned from proof reader, and, after approval by the author, turns it over to the stoneman. If the shop is small, he performs the duty of stoneman himself. In jobs set partially by machine, he sets the rest of the lines, throws space between lines, puts in cuts, and makes up pages. Some time is taken in distributing type and material, although the increased use of the monotype has lessened this item. In some plants he reads proof, orders stock, and performs other duties. In general, the smaller the job the greater the responsibility.

Promotion is toward make-up work as a stone hand, machine operator, or expert proof reader. The real tradesman regards the first as the only true promotion. The higher wages paid machine operators and a mechanical or literary bent cause some compositors, however, to regard the other jobs as worth seeking.

Many compositors go into business for themselves. This is made easy by manufacturers of printing machinery and supplies who extend credit beyond the point warranted by prospects for business success. Employers complain that this overcrowds the market, stimulates undesirable competition, and demoralizes trade. Many such establishments go out of business every year because of lack of capital and because of inexperience in business principles.

A compositor should have good eyesight, deft fingers, and steady nerves. He must be patient, painstaking, and accurate, and should be systematic, orderly, and neat in order to keep his cases in good condition, and not lose track of jobs, copy, or proof. Color sense is needed to set jobs in the best taste.

He can not have too broad an education, for he must deal with a wide range of subject matter. Many jobs require a sympathetic and intelligent attitude on the part of the compositor to express adequately the author's ideas. A compositor competent to show this attitude is always in demand.

Thorough knowledge of English, spelling, punctuation, capitalization, division of words, grammar, and paragraphing is essential. Weakness in any point leads to inaccuracy. A good compositor can correct manifest errors in copy. Knowledge of arithmetic through mensuration and compound numbers is necessary in order to estimate in both point and inch systems and monotype unit system.

The best compositors know enough of printing design to sketch roughly the layout of a page, and understand enough about weights and kinds of paper to select the kind suitable for the job. In small shops, the compositor needs to know the principles of imposition to do the work at the stone, and this in a large shop enables him to

take the place of the stoneman, thus improving his chances for promotion.

The skill required consists in picking up and manipulating type, "dumping" the stick, making up and justifying pages, inking galleys for proof, and handling single lines of type. This comes only from long experience. Proficiency in common-school branches, general information and acquaintance with literary standards, technical application of the principles of design, color harmony, and lettering, and knowledge of paper can not be attained while working on the job.

The common deficiencies are lack of general education, weakness in English, and ignorance of design and color harmony. The younger men are deficient in the fundamentals of other branches of the trade, such as binding, presswork, and stonework.

During the last few years the advertising man has taken from the compositor a large part of the responsibility for the artistic appearance of the job, by making rigid specifications as to every detail, from which he may not deviate. There will always be jobs, however, on which he must exercise taste and artistic skill. This makes training in this line necessary. Evening courses in applied design as well as apprentices' courses in the fundamentals—straight and job composition, stonework and proof reading—should be offered.

The linotype operators, numbering about 72, receive copy from the foreman just as do hand compositors. The linotype man sets body-type matter and small display lines, places the cast slugs (lines of type) on the galley, and makes corrections in the galley by resetting lines containing errors. In many shops he must keep the machine adjusted properly and make some repairs. Large shops and newspaper offices employ linotype machinists for this work. Operators are from 30 to 50 years old, and are paid \$24 to \$30 a week for the usual eight-hour day. The union scale is \$24 and \$27.

Many operators were formerly hand compositors. Some have had little experience as compositors. There is no line of promotion, the only advancement being increased wages with improvement in accuracy and speed.

The machine operator should have nimble fingers to operate the keyboard and be a quick thinker to acquire speed and accuracy in performing the many details of his work. He must be able to concentrate his mind on the copy and still carry the measurement of the line he is setting, in order to obtain correct spacing.

These qualifications call for mental ability different from that of the hand compositor. With less variety of detail to interest the worker, greater capacity for sustained mental effort and nervous strain is required. However, the work is performed while seated, permitting a lame or otherwise physically deformed workman to

be a satisfactory machine operator. He needs even better eyesight than the hand compositor to endure steady work on bad copy.

He should have the same educational qualifications and technical knowledge as the hand compositor and also understand the machine thoroughly and know the proper temperature of metal necessary to get good type face of slugs. He does not need all the technical skill required by the hand compositor. His efficiency depends rather upon ability to read manuscript rapidly and operate keys simultaneously. He should be able to make adjustments or minor repairs on his machine.

All these qualifications can be developed on the job, but some men go to machine schools. The best operators are hand compositors who have gone over to the machine. It takes about a year to develop an operator in this manner. Common deficiencies of machine operators are the same as those of hand compositors.

Little training is to be had for this position outside the routine. The great need is for the broad fundamental training of the hand compositor. It is not enough to learn the keyboard. Improvement in printing standards will come only as previous training and experience in hand composition is required of all who expect to be machine operators. Some instruction in construction of the machine would be valuable.

Monotype keyboard operators, of whom there are about eight, differ from linotype operators in that they perform only one part of the process, that is, operate the keyboard. Casting the type is not done at the same time or even in the same room, as in linotype work. The monotype operator, by a keyboard, perforates rolls of paper, which control through pneumatic process the operation of the caster machine.

He must care for this keyboard and make minor repairs. He puts in new rolls and takes out perforated rolls, changes the machine for different sizes of type and width of composition, which require changes of drum scales and keyboard, sets the em rack to different measures and casts up copy if the form is tabular. He must figure various columns of picas, and allow for rules or other material to be inserted by hand. His responsibility ends when he turns over the perforated rolls to the caster man.

Monotype operators range from 30 to 50 years old, and are paid \$20 to \$27 a week, working eight hours a day. Like linotype operators, they come from the composing room or a monotype school. The statements as to the linotype operator regarding preference for the former training and the difference between machine and hand composition in their demands on the nervous system, apply equally to the monotype operator.

Greater facility in mathematical calculation is required of the monotype operator than of the linotype man, inasmuch as he must make constant mathematical calculations in operating the drum scale, and in estimating space rules and other material in the completed form. He needs thorough knowledge of the compositor's art but does not need the skill of a hand compositor.

The peculiar qualification of a monotype operator is thorough acquaintance with his keyboard and the general mechanism of the machine. He must understand the relation of the keyboard to the caster machine, to keep the caster going properly when it receives the roll. He needs to know something of the construction of the caster, have a thorough knowledge of the drum scales for different sizes of type, and know how to reduce picas to set ems in order to set the em rack on his machine. He must know how to cast up copy, and make allowance for cuts and rules.

Some operators are trained at monotype schools. First-class hand compositors make the best operators, learning to operate the machine in about one year. Five or six years of training would be necessary to make an experienced monotype man out of a green workman. Comments on the deficiencies of linotype men apply also to monotype men.

The caster men, about four in number, operate the caster machine and air compressor. Receiving the perforated roll from the keyboard operator, the caster man adjusts it to the caster machine which automatically casts single pieces of type. He is essentially a machinist and needs to know practically nothing of the printer's trade. Caster men range from 25 to 35 years in age, and are paid \$24 to \$27 a week on an eight-hour day. Most of them come from monotype schools, where they have been thoroughly trained to operate and repair the machine. Few compositors take it up. These practically shift from the occupation of printer to mechanic.

Caster men obtain their positions through the manufacturers of the machine. It requires four or five years for a green hand to acquire efficiency. A machinist can learn to operate the caster in less than a year, three months of which must be spent in a monotype school.

The number employed as stonemen can not readily be separated from those employed strictly as compositors. A good compositor is usually a fair stoneman. If the work in the shop is sufficient to occupy one man's time, the stoneman is important in maintaining an efficient flow of work. He is the connecting medium for the composing, stock, and press rooms. He receives the job from the compositor and locks it into forms prepared for the press. This consists of placing the job on the "stone." He sometimes makes author's final corrections, regulates forms on the press and makes press corrections. His direct

responsibility ends, however, with delivering the forms to the press-room.

He is usually an older man than the average compositor, is paid about \$25 a week, and works nine hours a day. In contrast with the compositor, he does not come direct from the country shop. Some experience as helper is necessary before he can take charge of make-up of forms. After long experience on the stone, if competent, he is advanced to the position of foreman. In many shops one person is both stoneman and foreman.

He must be larger and heavier than a compositor in order to handle the heavy forms. His general education should equal that of a good compositor, with additional proficiency in arithmetic to figure margins, trims, and stock cuts. He needs all the trade knowledge necessary to a first-class compositor, and must understand thoroughly the principles of imposition; that is, laying out various book forms to suit folds and various machine folds. Imposition is the art of arranging type pages on the imposing stone so as to cause them to appear in their proper places on the folded sheet. He must know how to figure margins, trims, and stock cuts, sizes and kinds of stock, so as to reduce waste in trimming; and must understand size, speed, and efficiency of presses so as to insure the most economical work.

The skill, acquired only through long experience in the routine, lies in handling and manipulating type pages, adjusting pages and arranging the distance between pages, "squaring up" forms that pages may be properly registered when printed, and registering forms on the press. All this additional knowledge and skill must be obtained in the shop, except the principles of composition and the study of paper, which can best be obtained in outside classes.

The copyholders, 10 in all, read copy and watch copy while the proof is being read back for comparison with the copy. About one-half of them are women. Good sight and steady nerves are necessary. A copyholder should be intelligent, well read, quick to detect errors, conscientious, attentive, and able to concentrate on copy because of the importance of the work. She should, if possible, have a high school education, with emphasis on English.

No particular skill is required for this job. A few days' experience enables the workers to give satisfaction. Promotion depends on ability to learn proof reading, and on accuracy and speed. Many fail to become proof readers because of weakness in English; others fail to realize the relative importance of the position or are inattentive. Wages are \$10 to \$16 a week.

When the copyholder is sufficiently acquainted with the general routine of proof reading, she is given proofs which the compositor has corrected, to compare with the original proof. If O. K., they

are so marked and sent to the author; if not, they are returned to the compositor. This is called revising. It requires more general knowledge than holding copy, also a knowledge of proof reader's marks. This serves as apprentice training for full-fledged proof readers, though the job is not always clearly defined. A copyholder who can revise is known as a proof reader.

The proof readers, of whom there are 15, have been compositors in some cases and in others have served apprenticeship as copyholders and revisers. Many are women. A compositor with pronounced literary taste and mediocre mechanical skill is likely to drift into the proof-reading room where his knowledge of composition proves valuable. If he has an acquaintance with literature and a large fund of general information, his usefulness secures him a much higher wage than he could earn as compositor. In the small shop, a compositor reads his own proof. Proof readers are paid \$12 to \$20 a week, according to speed and accuracy.

The duties of the proof reader are evident enough to make extended detail unnecessary. A good proof reader makes grammatical corrections and calls the author's attention to other manifest inaccuracies. Good eyesight, ordinarily good hearing, power of concentration, appreciation of the importance of details, and systematic habits are prime requisites.

He should maintain an even disposition and not be easily irritated, as he is constantly called upon to deal with foremen and compositors during a rush of business. To be successful he must have a thorough knowledge of English, and be well read. Acquaintance with a foreign language is a valuable asset.

The only technical knowledge needed is acquaintance with proof reader's marks. It is desirable, however, to know the various characters found in the compositor's case, understand the point system in order to mark proof intelligently, and know the names and uses of the materials in the composing room.

The skill involved consists in accuracy in detecting errors, rapidity in marking proofs, and a knack for reading poor copy. The difference between the ordinary and the excellent proof reader usually lies in their general education. Advancement in wages can best be gained by constant reading and study along general cultural lines. The evening university and high school classes afford such opportunity.

The foremen are the most important productive units in composing rooms. Upon the foreman rests the responsibility for turning out the grade of work demanded. He usually has full authority to hire. He receives the job from the office, assigns work to the various employees, supervises the work, and cooperates with the foremen of other departments until the job is delivered to the author. His

immediate responsibility continues until the job receives his O. K. for the pressroom. He and other department foremen constitute the trade cabinet on which the success of the house absolutely depends. None of the commercial shops employs a superintendent of the mechanical department as distinct from the commercial management. This throws additional responsibility on the foremen. The foreman of the composing room is usually about 40 years old and is paid \$30 to \$35 a week. His position represents the end of the line of promotion.

He should have all the qualifications necessary for any position in the room. He must have executive ability to control his men systematically, plan the general routine of the shop, and direct the work of all so that a minimum of time is lost. He should be level headed and able to think clearly in rush of business. He should have accurate color sense.

In general education he should be better equipped than any other in the room, know what to expect from men, and correct any deficiency in the work. He must know all the compositor knows about the trade and as much of the stoneman's duties as possible. He should know enough about other departments to cooperate in making the job a success; for example, speed, size, and kind of presses, size and kinds of paper, various folds of machine folders, and the plating process. Skill in judging quality of work, in handling men, in keeping the work moving systematically and economically, and in harmonizing difficulties between office and men are the characteristics of successful foremen.

While many foremen possess inherent leadership not to be obtained by any system of education, many journeymen compositors are without capacity for promotion not because they lack executive ability but because they lack trade knowledge or skill. For example, a compositor who does not know the principles of imposition can never expect to become a foreman. The ambitious compositor, by taking evening courses to correct his deficiencies, can greatly improve his prospects.

NEWSPAPER COMPOSING ROOM.

Job and newspaper composing rooms differ in their organization and in the character, quality, and speed of work required. The newspaper employs proof boys, hand compositors, linotype operators, copy cutter, "dump man," "make-up men," proof readers, and a foreman in each end of the room. The work is of two kinds, display ads and straight composition, the former done by hand and the latter, including want ads, single lines in advertising matter, and headlines, by machine. The time element is predominant, quality of workmanship secondary. All are impressed with the importance of speed.

To "miss a mail" is the one thing to be avoided. As the newspaper man puts it, "pep" is the first qualification necessary to continued employment.

This characteristic tends to separate workers in the newspaper shop from successful job compositors. While there is considerable shifting back and forth, the indifferent standards of workmanship in the newspaper composing room irritate the slower, more methodical, and painstaking worker in the book and job houses, while the highly developed team work in the newspaper office attracts those of opposite temperament. The best newspaper men are those with preliminary training in a commercial shop. Long service is more common in a newspaper than in a job composing room.

Proof boys, of whom there are five, are between 16 and 18 years old. The proof boy spends most of his time doing one thing—taking proof at the "dump" as fast as the various "takes" are brought by the machine operators. He does this for about a year, and is then promoted to be compositor's apprentice. Scarcity of linotype operators formerly furnished a short line of promotion for bright errand boys, who, after a short time on the "make-up," were put on the machine. Union regulations now require that all machine operators serve the regular compositor's apprenticeship, the last six months of which may be spent in learning to operate the machine.

The proof-boy job does not afford as good an opportunity to learn the printer's trade as that of errand boy in a commercial shop, because of the narrow range of trade experience in a newspaper shop and because a boy is kept longer at one job. His chances for a trade education as a newspaper printer during apprenticeship are superior, however, to the opportunity offered by the commercial shop for adequate, well-rounded training as a job compositor.

The apprentice compositors, numbering about 10, have about the same duties, regulations, and wages as apprentices to the book or job house. After a year working the proof press at the "dump," the apprentice compositor assists on "make-up" for a few months and then goes to the ad composing room, where he learns to prove up ads, care for rollers, and set ads.

Upon completion of his apprenticeship he becomes a journeyman and stays in the ad room, goes into make-up, or learns the machine. Under the trade agreement he is entitled to a regular "situation," however, only if the office will create one for him. Otherwise he takes his place at the foot of the "sub" list. His greatest deficiency is lack of general education. Because of the mediocre standard of workmanship required and the fairly satisfactory apprentice training there is no serious technical educational problem.

Ad compositors, numbering 170, are regularly employed in newspaper ad composing rooms, with a waiting list of about 35 "subs."

A "sub" does not hold a regular situation, but works as a substitute. Each compositor obtains his own substitute. When the office wishes to add a man the first name on the list must be taken. Rules regarding "priority" on the "sub" list regulate the entire matter and protect the journeyman desirous of a position in a certain office and department. Entrance as journeyman in any department is limited almost entirely to those who have first substituted. This means a period of from two to four years as "sub."

- All that has been stated about the substitute list applies to ad men (hand compositors), machine operators, machinists, and proof readers, separately. All workers in composing rooms receive the union scale, \$25.92 a week of 48 hours for day and \$28.80 for night work. For machine operators there is a piece scale.

The duties of the hand compositor differ from those of job compositor principally in being connected with only one line of work, namely, setting of display ads and head lines.

Newspaper compositors are older than job men and remain longer in the same shop. This is due to higher wages, less seasonal character of work, influence of trade organization, and a certain fascination similar to that in railroad service. Promotions are slow, but there is no scarcity of men with promotional capacity.

A wide knowledge of commercial terms is of great value to the compositor. One foreman suggests the constant study of catalogues, particularly those of dry-goods houses. Speed rather than technical skill is looked for in a newspaper job. It is doubtful whether any outside training can be had that would improve this worker's prospects. Continuation courses in the printing trade are intended chiefly to improve workmanship and artistic taste and skill. Speed comes only with practice.

The linotype operators, of whom there are 91, have duties no different from those of the job shop, except that more speed is required. A linotype operator works six hours a day and is paid by the piece. The average operator is paid \$25 to \$28 a week, although a good machine man gets about \$35 for a week of 36 hours, and on night shifts, \$3 more. Usually he is older than the job man, and has been in the office several years. Not many linotype operators have come from the country. The drift is the other way, the country shop looking for men doing both hand and machine work. Many machine operators have learned the machine directly with a very short apprenticeship in "make-up" work and at the dump. A regular apprenticeship is now required.

In one respect, in particular, a machine operator in a newspaper office can be very useful—in detecting evident mistakes that have slipped by the editorial room. Much newspaper copy is prepared in

great haste, and, in spite of the greatest care, mistakes occur. If the linotype man knows, for example, that a certain address should read Sixth Avenue North instead of Sixth Avenue South, or that Mr. A is holding a certain office instead of Mr. B, he calls it to the attention of the foreman, thus increasing his value to the newspaper. This, of course, shows the value of a general education and an alert attitude toward men and measures.

The dump man, whose job is peculiar to the newspaper office, has general supervision of the "takes" brought by machine operators to the "dump." He supervises the work of the proof boy and keeps general track of the material. He does not have to be a compositor, but usually is. He is likely to be elderly, skilled in handling type and galleys, and orderly and systematic. No other special qualifications distinguish him from the ordinary compositor.

The copy man, sometimes the foreman, receives copy as it comes from the editorial rooms, and assigns it to various departments. He handles everything except display ads, which go directly to the foreman of the ad composing room. He receives the regular scale of wages, sometimes one or two dollars more. He must keep track of many pieces of work in different parts of the room, and needs to know the proficiency of different operators in order to assign copy. He is usually an experienced make-up man. His peculiar duties can be learned only in the routine.

It is difficult to get the exact number of make-up or stone men, as their work is done by the foreman or his assistant with the helpers needed. On a 32-page paper it takes much help to keep things moving and finish this work in the two hours usually allotted. Making up forms in a newspaper shop differs from stonework in a job shop largely by the characteristics referred to in the case of various employees. The page-form trucks on which the make-up takes place occupy the center of the composing room. After the various "takes" have been proof read they are worked into page forms with skill and speed born of long practice.

The make-up man must know where to place certain advertising, what reading matter is coming, and where to place it. When he gets it all in order, the entire arrangement may be changed at the last minute, and yet the page must be sent to the stereotyping room on the minute. He must be cool-headed, ingenious, and discreet in classifying news and work in harmony with the editorial room. During the last few minutes of make-up he works with representatives of the editorial rooms in eliminating and rearranging matter. Skill comes with long practice. Make-up men have always been hand compositors, are 25 to 45 years old, and are paid the scale. The line of promotion is to assistant foreman.

Two assistant foremen have charge of the ad room and the "news end," respectively. They usually have come up through promotion in the same plant. They are 40 to 55 years old and receive from \$30 to \$35 a week. The line of promotion is to foreman.

The duties in the ad room are like those of foreman in the job shop, with more emphasis on speed. The assistant foreman is in charge of the news and of the make-up, spending most of his time in supervising helpers and apprentices. The last hour before press time he personally makes up the last pages, working finally in consultation with the editors. Education equivalent to a high school course is necessary. A most important factor in making each daily issue of a newspaper effective is discretion in arrangement of news and advertising matter. This requires news sense and knowledge of the general policy of the paper. The training necessary can be acquired only on the job.

The proof readers, 18 in number, receive copy and proof, read and mark it for errors, and return it to the machine operators for correction. More than half are women. The proof reader in a newspaper office has more responsibility than the proof reader in job shops, who is expected to follow copy, except in case of manifest errors. He always questions the copy, but makes no changes without first submitting it to the editorial rooms, unless in case of a rank blunder.

He must watch for undesirable sentences and advertising, and may thus save a newspaper from a costly libel suit. The foreman of a newspaper composing room does not have to O. K. the copy before the forms are finally locked up and sent to the pressroom, as is done in the commercial shop. This places additional responsibility on the proof reader, and requires more mature judgment and general education and culture than is required by the commercial shop.

One person, usually an experienced printer, has general supervision of all proof reading. He should be the best informed person in the room, as he is the responsible connection between the editorial, advertising, and mechanical departments. He receives about \$27 a week, and is 35 to 50 years old. Vacancies are few and the job hard to fill.

The foreman of a newspaper composing room is usually a man between 40 and 55 years old, who not only has the qualifications required of assistant foreman but also has those of an effective leader. In some shops he performs such duties of mechanical superintendent as he can. He receives \$35 to \$45 a week. The newspaper printer is a better informed man by virtue of his daily work than the average tradesman. The nature of the business requires a high degree of organization and system in the mechanical department and a harmonious cooperation among workers, especially in the composing room, to issue an edition in two or three hours. The foreman is

caught between the two forces—the most effectively organized of trade organizations and the demands of the job. This pressure is always great, and when the “news” is late and the paper a large one only a real leader of men can effect the teamwork and speed required.

He should have business capacity to operate the composing room economically. This room has always been a source of great waste, due to traditional disregard of business principles. A foreman who can organize his workers so as to reduce labor cost, buy materials to advantage, eliminate wasteful methods, and keep the good will of workers is very valuable. In many cities there are constant vacancies in this position, owing to scarcity of men possessing these qualifications. Locally there have been few changes. This position is the highest to which the proof boy may aspire. The position of mechanical superintendent, which is not yet fully developed, requires broader general education than can be obtained by the worker leaving school at 16.

The mechanical superintendent holds the highest technical position on a newspaper. This position varies in duties, qualifications, and salary. Two types appear in the various newspaper plants in large cities and both exist in Minneapolis.

If the plant is not too large, the foreman of the composing or press room may act as mechanical superintendent. His duty is to coordinate the departments, buy equipment, presses, and machines, and assume as much responsibility for the technical work as his ability and duties permit. He is always promoted from the ranks. His salary is \$35 to \$45 a week. In addition to his qualifications as foreman he needs to be well informed on mechanical and scientific subjects. This type is what might be styled a self-made man. He lacks general knowledge of the theories underlying the duties of his position as much as he excels in practical experience.

With the passing of this type the newer kind of mechanical superintendent is beginning to appear, who is expected to assume entire responsibility for the mechanical department. He manages the upkeep of the building, prospects and contracts for construction work, superintends the buying of equipment and materials, and directs, through foremen, the operation of departments. The latter duty does not appear until the circulation of the paper becomes large enough to require one man's entire time in superintendence. At present no Minneapolis paper has reached this point.

These duties require broad university education, including courses in civil, mechanical and electrical engineering, and enough actual experience on the job to equip him to direct the work. His technical equipment, for example, should enable him to make architect's plans

for alterations in building arrangements, contract economically for paper and other supplies, and confer intelligently with the manufacturer and make suggestions.

Men competent to fill this position are very scarce. (The mechanical superintendent of a large Chicago paper receives \$15,000 a year.) They have to be individually trained. One Minneapolis paper has sent its superintendent to the Government Printing Office at Washington to study the analysis of inks and to Chicago to study the electrotyping process. This position in Minneapolis now pays about \$50 a week.

PRESSROOM OF BOOK AND JOB HOUSES.

The appearance of linotypes and monotypes in the composing room has been paralleled by a corresponding improvement and specialization of machinery in the pressroom. The effect on the workers has been quite different. In the former case it has interfered with and even threatened the extinction of a time-honored hand trade; in the latter it has opened up greater possibilities for workmanship. In the one case the educational problem is to resist the influence of machine methods on the worker long enough to give him sufficient trade knowledge, and in some cases train him for the higher grades of hand composition. In the other it is to keep pace with the development of the machine.

A marked characteristic of the average pressman is self-satisfaction. This is unfortunate because of the wide gap between his general information and the increasing demands made on him.

The pressroom of a large shop contains job and cylinder presses of various kinds, the tendency being toward greater specialization. This will increase the educational importance of a carefully planned preliminary training of apprentices. For the one job of pressman, apprentices, press feeders, and errand boys are all in line of promotion.

The foreman has general supervision of the room. Large shops have both job and cylinder pressrooms, with separate organization and different foremen. There is a scarcity of workers equipped to be high-class pressmen and many shops go outside in filling vacancies. Practically no pressmen come directly from country shops.

The errand boy in a pressroom is usually 15 to 18 years old. He should be strong, on account of heavy forms and piles of stock to be handled and should weigh at least 125 pounds. He does not need as much intelligence as the composing room errand boy, nor school education beyond the sixth grade so far as his duties now require. All that was said about the deficiencies of errand boys in the composing room applies to him. If he is efficient he works into a job as a press

feeder. While in the pressroom, he gets no opportunity to try his hand in the composing room.

The press feeders number about 200, including all assistants. They oil and clean the press, assist in placing forms on the press, assist in "make-ready," feed stock through the press, pile stock and "fly" stock, which consists of lifting printed matter from the jogger board and placing it on trucks or the table. Press feeders are 18 to 50 years old and are paid \$12 to \$15 a week. They are recruited from errand boys and from outside, in the proportion of about 1 to 5. If ambitious, their prospects for an apprenticeship are good.

A press feeder should have nimble fingers and good sight to feed rapidly and accurately and should not be nervous. The constant liability of the stock to back up while running through the press requires alertness and coolness in case of emergencies. He should have a good memory to follow instructions and carry messages back and forth to the composing room. He must know enough arithmetic to set the counting machine.

A good feeder is familiar with the machine and its oiling, and acquires facility in assisting the pressman. He should know how to adjust automatic feeders. He should understand the care of inks and rollers, and know how to wash up for color. The more he learns about "make-ready," the greater assistance he renders and the greater his prospects of promotion. He ought to know enough about paper stock to follow instructions on the job ticket.

Skill in feeding consists in facility in packing the press for different grades of work, handling paper so as to avoid waste, feeding stock so as to obtain exact register, and feeding rapidly on cheaper work. There is little knowledge that can not be acquired on the job, and skill is attained after a few months' work. It is entirely possible to qualify for promotion, however, by attending continuation courses in applied mechanics and chemistry.

The apprentice pressmen, numbering about 20, have the same duties as pressmen, except that they work on cheaper jobs and smaller presses under the nearest pressman or foreman. The first part of the apprenticeship is spent in feeding; other duties are taught as the work permits and as the apprentice shows ability. Apprentices come from the feeders and become pressmen in about four years, although some are content to remain as "two-thirders."

The pressman's apprentice comes nearer to getting an adequate training than the apprentice compositor. This is due to difference in organization and the simpler nature of the work. A 90-day trial determines his promotion from feeder. He works under closer supervision and has a better opportunity to learn than the apprentice compositor. It is harder for him to enter a journeyman's position.

His deficiencies are usually lack of general education and failure to appreciate the possibilities offered by the trade. This is not entirely his fault, but is rather due to the rapid development of the trade and the absence of suitable continuation courses.

A further deficiency, if he is in a large shop, is unfamiliarity with other departments. This can be met only by affording early opportunity to become acquainted with the fundamentals of the entire trade. The commercial organization of the institution forbids such experience. The all-day trade school for beginners and evening courses for those already at work afford the best solution of the educational problem.

Of cylinder or job pressmen there are about 90 in the city. This worker receives the copy and job ticket from the composing room or the foreman, makes ready the press, runs the job, and supervises the feeders and apprentice pressmen. One pressman supervises two cylinder presses. The "make-ready" is perhaps his most important technical duty. This consists of two parts—after preliminary gauging of the form on the press, the cylinder is packed with paper, to furnish a proper printing surface; after setting the guide for feeding, he pulls a proof for the final O. K. from the composing room. This completes the preliminary "make-ready."

While proof is being read in the composing room, he planes cuts to make them type-high, or underlays them. Some shops gauge cuts type-high before forms are made up. After receiving the final O. K. from the composing room, he pulls proof for use in his final "make-ready." This consists of "marking out the sheet" (indicating where the impression is too faint or too heavy), "spotting up" the weak parts (pasting paper of proper thickness on the "make-ready" sheet later placed on the cylinder), and "cutting out the high spots" which print too heavy. In half-tone work special and hand-cut overlays are made. In some shops mechanical overlays are preferred in certain work. Ages are 25 to 50 years and wages \$22 to \$40 a week, the average being about \$30. Job pressmen earn \$12 to \$20.

It takes 6 to 10 years to develop a first-class pressman. Deftness and delicacy of touch in the "make-ready" process, physical strength and vigor, good eyesight, and a fine color sense are the physical characteristics demanded. He should be free from throat and lung trouble, because of the inks and acids used. Good hearing enables him to detect loose parts of the press, quoins, etc. The job pressman has similar duties and requirements, except that the work is on a smaller scale.

The pressman should be mentally alert, cool-headed to meet emergencies, possessed of executive ability to work with and handle press feeders, and systematic in his work so that presses will be in opera-

tion the greatest possible time. He should be a mechanic and yet have artistic sense.

His general education should include arithmetic, through mensuration and compound numbers, so that he can figure weights, sizes of papers, and pounds of ink to the job. He should know English well enough to recognize errors that have escaped the composing room; should know the simple principles of chemistry, for use in handling inks, and something about physics, especially principles of mechanics and atmospheric conditions to which rollers, inks, and papers are susceptible, and some of the simpler principles of electricity to guide him in making minor repairs. A knowledge of the principles of light and shade for use in the "make-ready," of half tones, of color harmony, and of hygiene and shop sanitation, is considered a desirable qualification by progressive pressmen.

The work requires sufficient knowledge of machinery to make necessary adjustments, a thorough knowledge of "make-ready" and an acquaintance with the sizes of presses used, and something about papers and inks. It is desirable that he know something about sizes and styles of type, and understand the rules of imposition, as some jobs are all plate work and require no hand or machine composition. If he can size up the commercial importance of each job, so as to gauge and plan the time necessary for its completion and delivery in accordance with the cost estimate made by the office, he is much more valuable.

The skill of the pressman consists in handling paper so as to avoid soiling and tearing, mixing inks so as to achieve color harmony, cutting and making mechanical overlays to bring out the artistic effect, handling the press so as to regulate correctly the flow and distribution of the inks, and obtaining proper cooperation from press feeders.

The common deficiency of the pressman is lack of general education and failure to realize the importance of scientific knowledge. The rapid development of presswork has left behind trade standards of 10 years ago, without providing instruction for beginners, or affording opportunity for workers to keep abreast of modern methods. The average pressman would be far more valuable if he knew something of chemistry, physics and hygiene, and industrial art. Such knowledge can not be acquired on the job. Workers should be encouraged to seek supplementary training in evening courses.

The foremen of pressrooms, of whom there are about 65, including 20 job press foremen, have about the same duties as the foreman of the composing room. The pressroom foreman receives tickets and forms from the composing room or office, lays out work for the different

men and is responsible for the economical handling of the room, men, and machines. He cooperates with other departments and buys some supplies, inks, and oil. He is usually about 35 years old, and has worked his way up.

He needs more executive ability than the foreman of the composing room, as he deals with men of a different type. He must have an excellent memory to carry in mind the specifications of various jobs running at one time, as he does not have the job ticket in his immediate possession.

All that was stated regarding the better education needed by pressmen applies with added force to the foreman, and he should have special knowledge of English. He must be able to estimate the use of materials, speed, cost of presswork, and have a working knowledge of mechanics, chemistry, electricity, and hygiene as applied to presswork. He must have a thorough knowledge of paper and inks, and of capacity, speed, and quality of work of all kinds of presses. Long experience in managing presswork and skill in handling men, judging quality of work, and keeping the work moving economically and in a workmanlike manner are the most important characteristics of a successful foreman. He is especially valuable if he can effect proper cooperation by the employees, the office, and other departments. He should have nerve and ability to command respect.

NEWSPAPER PRESSROOM.

The newspaper pressroom differs from the commercial plant in organization, quality of work and kind of product. It resembles a factory with its single type of high speed, intricate machinery, lack of variety in raw materials, and its single product, a newspaper. The work is heavy and requires speed and alertness, with the skill of the mechanic as well as of the printer. Not so high a grade of technical skill and knowledge is required in any of the positions in a newspaper pressroom, and employment therein does not train a workman to be an all-round pressman. Very few newspaper pressmen become commercial pressmen. Some commercial pressmen become newspaper pressmen, attracted by the higher wages. Each web press is manned by a crew of four, the head pressman and his assistants, an oiler, a tension man, and a first assistant. A foreman has general supervision over the entire room.

The third assistant pressman, the "oiler," oils and wipes up, washes rolls, and assists to put on and take off plates. He also helps put the large paper rolls on the press. He should have more than usual strength and vigor and no tendency to lung trouble, as the work is confining and the temperature high. He should have good

hearing and sight. He must give close attention to his work and be quick and alert to detect anything wrong in the operation of the press. Little schooling is necessary. Knowledge and skill include knowing location of oil holes, locating hot journals quickly, watching the press for hot boxes, and keeping it clean of oil.

The common deficiencies of pressmen are those of the commercial shop, only to a greater extent. While it is doubtful whether any job in the newspaper pressroom requires extended technical training, the limited general education of most pressmen makes it necessary, in order to advance, for beginners to have more general schooling. Some knowledge of mechanics and trade hygiene would be of definite assistance. An oiler receives \$12 for a week of 48 hours.

After two years' experience the oiler is promoted, if there is a vacancy, to tension man with the duty of seeing that the paper runs through the press properly. He also puts on plates for one side of the press. He must know how to lay the plates so that pages will appear in their proper place, and how to assist in putting the blanket or tympan on the press. (This is the only "make-ready" necessary in the newspaper pressroom.)

He is responsible for the condition of the press before it starts. He acquires skill in handling the tension, adjusting it so that the paper piles evenly, and avoiding any slack. He is paid \$18 a week.

Promotion to the position of first pressman comes after four years in the preceding jobs. This worker places plates on one side of the press, and watches the tension and the press to see that everything runs smoothly. He must be more of a mechanic than the tension man, as he has to set the machine for different sizes of paper. He must know the layout of the paper, and how to set rolls and operate the machine for different sizes. It takes about four years to acquire sufficient knowledge and skill for this job. He receives \$22 a week.

The foreman is recruited from pressmen and is usually about 40 years old. Wages are \$25 to \$35 a week. It is his duty to receive instructions from the managing editor, lay out the work for each press, and supervise the room. He must have an unusually keen mind and a gift of leadership.

The character of the work and the type of men in a newspaper pressroom demand qualifications on the part of the foreman similar to those of a successful military leader. He must have the respect and good will of his men to secure loyal support in emergencies. The general demand for speed reaches its climax in the pressroom. The foreman many times must make up time unavoidably lost in the editorial or composing room. He needs more general education than other workers in the room, and if possible, a high school training. He must make calculations in connection with papers and inks,

and should know all makes of presses and the best oil, inks, and papers for his work. In one shop in Minneapolis he is also the mechanical superintendent.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS OF SURVEY COMMITTEE.

The principal defects in such vocational training for the printing industry as now exists are four in number:

1. For the boy who will some day enter the industry: There is no adequate system of preliminary experimentation by which he may discover his aptitude for the printing (or other) trades and be informed of the qualifications essential to success.

2. For the boy at the time he seeks entrance to the industry: Insufficient supervision of the transition from school to job. The school's acquaintance with the boy is not made to serve in any organized fashion in assisting boys, parents, and employers in determining the wisdom of attempting an entry into the printing trade.

3. For the beginner who is learning any of the printing trades: There is no adequate system of apprenticeship, a complete round of trade training along carefully charted courses evidently not being given in the modern printing office.

4. For the journeymen in the trade: Insufficient opportunity to correct serious defects in trade knowledge and skill, and to become acquainted with new methods and processes. The commercial demands of the shop and the growing tendency toward specialization makes continued vocational training in the routine of the job increasingly difficult, but also necessary.

All this points to the need of trade extension work in part-time and evening classes for those already engaged in the industry.

As a result of the above facts the following recommendations and plans have grown out of the survey:

1. The present prevocational courses in woodworking only, found in the elementary schools, should be extended to include printing for those who have finished the sixth or seventh grade, and shown any aptitude or desire for the work. This should be carried on under conditions as nearly commercial as possible. The academic work should be related to this shopwork as closely as the organization of the school will permit.

While working as an embryo printer there is excellent opportunity for extension of the training in English. A suggestive course of study for a general scheme of prevocational training will be found in Chapter XXIII (see p. 526).

2. Since 1914 a two-year course for the purpose of supplying the needed instruction for beginners has been offered at the Dunwoody

Institute. This includes instruction in composition, presswork, paper stock, and related academic subjects. During the progress of the survey an advisory committee made up of two employers, two workers (a compositor and a pressman), and a representative of the school, was formed to aid in shaping the content and method of the work. As a result of this arrangement, employers have agreed to accept graduates as their preferred source of supply for new workers at an initial wage of not less than \$12 a week, and to permit them to pursue part-time courses either at the school or in the shop for five hours a week throughout 10 months of the probationary year.

As a further result of the survey, there have been organized at the Dunwoody Institute for apprentices and journeymen now in the trade, unit evening courses in straight and job composition, stone-work, applied design, "make-ready" for pressmen, inks, papers, etc. A lecture course for journeymen and foremen given by experts on such subjects as inks, papers, rollers, humidity, electricity, etc., is also planned.

CHAPTER XI.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR THE FLOUR MILL?

A large flour mill plant consists of a number of "mills," each having an elevator and machines for storing, cleaning, grinding, purifying and packing the wheat stock and flour, and each usually an independent productive unit. A "mill" is organized into wheat storage, cleaning, grinding and bolting, or "purifying," and packing and shipping departments.

The wheat storage department receives and stores the wheat in the elevator; the cleaning department removes dirt and chaff and washes the wheat stock; the grinding and bolting room is known as the "purifying" department; it breaks the wheat berry and separates the wheat from the bran by roller-sifting. In the packing and loading departments flour is prepared for shipment and placed on the cars.

For every mill, or "two or three mills," there is a head miller and a second miller. The storage department employs sweepers, loaders, an elevator man, a loader foreman, and an elevator foreman, in the order of wages paid, the last being responsible for all the work. In the cleaning department are sweepers, oilers, a helper, and a smutter, the last in charge of the work. Sweepers, oilers, helpers, a grinder and bolter work in the purifying department. In the packing department, packers and sewers prepare the flour for shipment by loaders in the loading department.

For the whole group of mills, there is an office and sales force, and testing, power, and maintenance and repair departments. Flour testers, chemists, a baker and a head chemist test the flour to keep it up to standard.

Power is supplied by water and by steam and electricity. Coal passers, firemen, engineers, and electricians are employed. Maintenance and repair work is done by millwrights, helpers, carpenters, and general laborers, plumbers and steam fitters, machinists and millwrights.

The estimated distribution in each occupation in the flour-mill industry was obtained as follows: First, the rate of increase of total employees in distribution and production was obtained by using the rate of increase of total employees in flour and grist mill manufac-

turing shown by the Civic and Commerce Association's census of manufactures for 1913 and the United States census of manufactures for 1909. This rate of increase was applied to the number reported engaged in production by the United States Census on Occupations for 1910, in order to estimate the number engaged in production in 1914. Taking the number thus obtained, 1,948, the proportionate distribution for each occupation within a standard type of organization studied was computed and applied to it.

TABLE 12.—DISTRIBUTION OF OCCUPATIONS IN FLOUR-MILL INDUSTRY.

Occupation.	Standard organization.		Estimated distribution in whole industry.
	Number.	Per cent of total.	
Roustabout or wheat loader.....	190	23.93	466
Head miller.....	7	.88	17
Second miller.....	6	.76	15
Smutter.....	15	1.89	37
Oilier.....	50	6.30	123
Grinder and bolter.....	74	9.32	182
Sweeper.....	58	7.31	142
Packer.....	210	26.45	515
Coal passer.....	21	2.66	52
Fireman.....	29	3.66	71
Engineer.....	15	1.89	37
Electrician.....	7	.88	17
Baker.....	1	.13	3
Chemist.....	4	.50	10
Flour tester.....	3	.38	7
Plumber and steam fitter.....	10	1.26	25
Millwright helper.....	24	3.02	59
Millwright.....	5	.63	12
Machinist.....	8	1.00	19
Elevator foreman.....	24	3.02	59
Carpenter and general.....	25	3.15	61
Elevator men.....	8	1.00	19
Total.....	794	100.00	1,948

FLOUR AND GRIST MILL PRODUCTS.

Minneapolis is the largest producer of flour and grist mill products in the world. In 1914 their value was over \$78,000,000, a little less than one-half of all goods of every kind made in the city. The business employed over 4,200 wage earners, and stood second only to the number in foundry and machine shops. The value of output per capita is more than 13 times that in foundries and machine shops. This is due to high cost of raw material and to improved processes of manufacturing.

The business of making flour and grists has grown rapidly, and shows a rising demand for workers. In the last five years the number of plants has increased from 13 to 22, or about 70 per cent, and of workers from 3,600 to over 4,200, or more than 16 per cent.

Most of the workers are employed in flour and feed mills. Of 22 plants, only three are cereal factories, employing 274 persons, and grist mills employ only about 700. As these represent such a small

part of the business, and what is true of the flour mills is largely true of them also, they are not given separate consideration.

There is no particular physical or nervous strain on the workers. The machines feed themselves automatically. The worker adjusts the machine and controls the flow of the wheat stock. The machinery is noisy in some departments, but the men soon get used to it. In the wheat storage and cleaning departments there are flying particles of dust and chaff, and only those with sound lungs should be employed. Most of the men who have been years in the business appear sturdy and rugged. The mills are striving, in some cases by medical examination, to avoid employing those to whom the dust would be dangerous. In numbers of accidents, according to the reports of the Minnesota Department of Labor, the flour industry of the State shows better for the last five years than most other industries employing large numbers.

The flour mills have an 8-hour day for all workers except sweepers, loaders, and packers, who are employed for a 10-hour day. There is no trade-union organization. Three shifts are operated in each mill. The first works from 4 p. m. to midnight; the second from midnight to 8 a. m., and the third from 8 a. m. to 4 p. m. Flour making is not a seasonal occupation, but slack months are May, August, January, and February. The custom is to lay off in the dull period many unskilled laborers, such as coal passers, firemen, packers, and loaders, and to retain the remaining force. In the last three years the mills have run to full capacity for eight to nine months, and to about 75 per cent capacity for about three months of the year.

SUPPLY AND DEMAND FOR TRAINED WORKERS.

All productive workers of the mill, except grinders and bolters and heads of departments and their assistants, can be trained in a very short while. A few instructions when they are employed and while becoming experienced in the routine seem sufficient. The men most lacking are competent head millers, second millers, grinders, and bolters. Nearly all have had years of experience in milling and have acquired a working knowledge of the process of milling as now carried on which makes them much in demand. Almost all are lacking in training, either in theory of milling or in technical or mechanical knowledge. The mills would like to produce, and do in some cases by promotion, their own grinders and bolters and millers, but frequently are compelled to go outside for them.

In one of the largest mills in the city last year the only promotions to desirable positions were one bolter to become a second miller and one oiler to succeed him. The wage of the grinder and bolter (about 42 cents an hour) is not sufficiently attractive to hold young

fellows of mechanical ability. As a result, sweepers are mostly adult foreigners, and oilers men without native ability to be anything more. It is becoming more difficult each year to obtain competent grinders and bolters, either by promotion or by transfer.

The second miller must know as much as the grinder and bolter and in addition be able to manage and teach other men. Few have these qualities.

The head miller is really the superintendent. He must be the best man who has come up through the ranks. The gap between his salary, \$2,000 to \$6,000 a year, and that of his assistant, \$4.50 to \$8 a day, emphasizes his importance. It is significant that in most cases head millers come from other and smaller mills. They lack at first the knowledge of the workings of the plant.

The superintendent, who is over the head millers of the various mills of a large concern, usually has had superior technical preparation. While the head miller lacks this, he has the actual experience impossible to get without years of service in a subordinate position. The superintendent's time is largely occupied in planning and directing work. Special training would make skilled workers like the grinder and bolter more competent and prepare them for promotion. If technical and mechanical preparation were given to promising workmen, improvements in construction and operations of the machines would undoubtedly result.

Workers are lacking in promotional capacity. This is the common deficiency. Unskilled positions are filled more and more with foreigners. About 75 per cent of the desirable positions are filled from outside the plant. These in turn are frequently not fitted for further advancement. The long wait for promotion does not attract and the nightwork required is unattractive. Few with mechanical training enter the production side of the mill. Boys with training finish the schools at from 16 to 17 years, while the flour mill takes, in general, no one under 20. By the time the boys are 20 they have gained a good start in other work. At present smaller mills in other cities are serving as training schools for new workers, who bring experience, but not technical and mechanical knowledge, to the mills of Minneapolis.

New workers are selected by department heads with approval of the superintendent. Outside the testing department, they fill an application blank and undergo no tests. Choice is usually made by personal interviews. New workers in the testing department fill out the same application blank used for employees in the main office. This blank, in addition to customary personal questions, asks whether the applicant or his relatives have ever had tubercular trouble. Space is provided for information as to school or college

attended, occupation during summer vacations, various positions held since leaving school, names of employers, salary, and reason for leaving positions.

There are no entrance tests save this written statement and inquiries sometimes sent by the head chemist to previous employers.

No special training is given. For positions below grinder and bolter, simple instructions start the men on unskilled work, which they soon learn to do well. Men who show interest and promise are quickly discovered and advanced, but not until the mill is able to obtain more capable men to learn the business by entering the lower positions will any systematic system of promotion be either possible or advantageous.

There are eight departments in a flour mill, excluding office and clerical force: Wheat storage, wheat cleaning, grinding and bolting, testing, packing, loading, power, and maintenance and repair.

WHEAT STORAGE DEPARTMENT.

Here are employed sweepers, wheat loaders, oilers, an elevator man, a loader foreman, and an elevator foreman, in the order of wage paid. In theory this is also the line of promotion, but few of the sweepers, and practically no loaders, are ever advanced. They are mostly Russians and Poles over 40, content to stay where they are, and not adapted to better positions. Some sweepers are also old men from other positions in the mill who are taken care of in this way.

What is said about sweepers holds true for the same work in every department. The loader foreman always has been a wheat loader. Oilers usually get promotion by transfer to more desirable departments to do the same work. Wheat loaders seldom become oilers or oilers wheat loaders; an exceptional loader would probably become either a loader or elevator man. Usually the elevator foreman comes from other and smaller plants or is assigned from other departments because of his knowledge of wheat. Sweepers, loaders, oilers, and elevator men are paid about the same wage.

The ordinary worker has little incentive to change from sweeper or loader to oiler. Sometimes an ambitious oiler in a large mill may shift from the wheat cleaning department to the same work in the grinding or bolting rooms, where positions ahead of him are more desirable.

Men holding the top positions of loader foreman and elevator man seldom change their work; in fact the employment of all workers in this department is practically fixed. Only three promotions took place last year, two loaders to loader foremen and one oiler to bolter.

SWEEPER.

About 142 sweepers are employed in all the flour mills of the city. They use brooms and brushes to clean up the scattered wheat in every department. What is said of the sweeper in the wheat storage department is true of him everywhere. He is usually 45 to 50 years of age, works 10 hours, and receives \$2.20 a day. Usually of foreign birth, he has no prospect of advancement and is content with his job, which he seldom leaves. He should have good health and strong lungs and be quick and active. Sometimes men over 60 do the work. Ordinary common sense is required, but no special knowledge or skill. The work can be learned in a few days. Practically none of the sweepers can do the work of a better job.

LOADING DEPARTMENT.

About 466 men are employed to unload wheat and load flour. The wheat loader sinks a heavy wooden scoop into the wheat at the far end of a loaded car. Automatic cables draw the scoop toward the door of the car, the loader returning it empty for another load. He is usually under 30, works 8 hours a day, and receives 24 to 27½ cents an hour. There is scarcely any chance of advancement. Last year two wheat loaders became assistant foremen in one mill.

The loader should be heavy and strong to handle the heavy scoop while wading through the grain. A new hand can be "broken in" in a day. No knowledge of any mechanism is required. In three or four weeks he becomes expert in handling the scoop, but while he may meet well the limited demands of his job, only rarely does he show ability to become loader foreman.

OILER.

Approximately 123 oilers are employed in all the mills. They work in all departments. The speed of the machines necessitates frequent oiling. With many machines to serve and hot boxes to be prevented, the oiler must move rapidly. He is 24 to 65 years of age, usually about 40. On an eight-hour basis he receives about \$2.40 a day. Chances of promotion are slight; only one oiler in the largest mill was promoted last year to be a bolter.

The oiler should be able to climb about quickly, and unless he is intelligent, observing, and careful his chance of advancement is poor. There is no need of any education for the work. He can learn in a week the locating of all bearings. Skill which he gains by experience consists in using the least oil and keeping bearings in first-class condition with the least effort. Not many oilers are capable of promotion.

ELEVATOR MAN.

About 25 elevator men are employed. This man is really an inspector of the elevator legs and spouts and the machinery at work in the elevator. He makes no repairs, but if something goes wrong, calls for the millwright. He must see that the different grades of wheat are handled to their proper bins. The wage for eight hours is \$2.50 to \$3.50. He is in line for promotion if he can do the work of elevator foreman. Few display promotional capacity. He should be able to follow instructions about guiding the wheat from the spouts to the right bin, and not get different grades mixed, and must know how to read, write, and figure, so as to keep simple records of where he puts the wheat. No technical knowledge is needed. A man with ordinary intelligence can learn in a week on the job all he needs to know. The skill required is ability to detect trouble in the machinery and shunt the wheat quickly.

LOADER FOREMAN.

There is one loader foreman at each elevator who has charge of unloading wheat from cars. The movement of the cars must be planned and a gang of men directed in the work of unloading and cleaning them. The foreman takes the car numbers and makes a report. He usually is about 40 years of age, receives \$2.75 to \$3 for eight hours' work, and has come from the ranks of the loaders. Physically and mentally he should be the best man of his gang. He must be able to boss a gang of 6 to 10 men, and plan their day's work. To keep the records and make simple reports about cars required, he must know how to read, write, and count. There is no need of any knowledge of wheat, or of technical or mechanical knowledge, as he is not responsible for the machinery. Skill lies entirely in getting work out of the men.

ELEVATOR FOREMAN.

There is one elevator foreman for each elevator. He gets a sample of wheat from each incoming car, inspects it, and sifts it to see if the dockage corresponds to the dockage, or deduction from total weight for chaff and dirt, allowed by the State inspector. He reports the results and stops unsatisfactory cars until proper adjustment is made, gives the order for grading wheat, and for its storage in different bins, according to quality; has general supervision over the elevator, and keeps records of the receipts, tests, and disposition of each lot. In this most important position, executive ability is necessary. A knowledge of weights and measures, ability to figure percentages, and keep general records are indispensable. More important still, he must know by sight and feel the different grades and qualities

of wheat. Skill lies in grading the wheat; this can be gained only by experience in the elevator.

WHEAT CLEANING DEPARTMENT.

In the wheat cleaning department are sweepers, oilers, helpers, and wheat cleaners or smutters, in the order of their wage and theoretical line of promotion. Sweepers seldom become oilers. In small mills the oiler and helper is one person. The helper is an assistant to the smutter. All that was said about the sweeper and the oiler under "Wheat storage department" is equally true here. Usually the helper is promoted to smutter.

About 37 smutters are employed in the Minneapolis mills. The smutter cleans wheat by running it over separators. The wheat passes automatically through a series of screens in machines of different construction to remove the foreign matter. The smutter inspects the stock at the different machines and makes various adjustments. For serious trouble the millwright is called. In some mills the smutter also has charge of the sweepers, oilers, and helpers on his floor but does not hire or discharge them. He has need for sound lungs because his room has the most dust. Mechanical sense of an elementary kind is necessary; also judgment to tell whether the machine for removing a particular element, such as corn or wheat chaff, is taking out the screenings too little or too much. He has no instructions to read, no writing or figuring to do. All he needs to know about the machinery he learns while working with it. It takes about two weeks to learn to judge the screenings and make adjustments. He is practically never shifted to grinding or bolting work.

GRINDING AND BOLTING DEPARTMENT.

The positions in order of wages and theoretical line of promotion are sweeper, oiler, helper, grinder, bolter, second miller and head miller. Sweepers are seldom promoted to oilers. Oilers from other departments seek promotion to this department as oilers because the flying dust is much lessened and the positions above more attractive. Most helpers have been oilers. Some come from outside as green hands. Grinders come most frequently from other and smaller mills, or are promoted helpers or transferred bolters. Grinders and bolters usually receive the same wage. Bolters come from other mills or from positions as helpers or grinders. The second miller must have been a grinder or bolter. Usually the head miller comes from a smaller mill where he had been both. The difficulty is to obtain competent grinders and bolters, second millers, and head millers who are skilled in their work and have the knowledge and ability necessary for higher positions.

What was said of sweepers under "Wheat storage department" will apply throughout in this department.

Some helpers work with grinders and some with bolters. In small mills they assist both. Previous statements about the oiler hold good with the helper. He must be very promising to become a grinder or a bolter; usually he lacks the ability.

There are about 181 grinders and bolters in the city. They hold the most important productive positions in the mill. The grinder has charge of the five sets of rolls by which the berry of the wheat is broken and then refined. The most important is known as the "first break," which crushes the berry so as to admit of proper separation of the different sizes of particles in the sifting and bolting room above. The grinder sets the rolls so as to keep them the same distance apart at each end, and prevent the breaks being too high or too low. If he gets the rolls too close, the wheat is ruined. If he gets them too far apart the grind is too coarse; and while he does not ruin anything, a loss is caused because the material has to be reworked. After the material has been bolted so as to separate the different sizes of particles, the coarser ones are returned four times from the bolting room to the grinding room and back again until the grain is reduced to commercial flour. Each time they are refined by being passed between rolls set closer together, and are then returned for further sifting. The grinder must see that the "head of wheat" is kept such as to give an even flow through the machine. He must be able to take the stock from his rolls, particularly that from the first break, and by inspecting it with eye and hand, tell whether the work is all right. If not, he must quickly adjust his rolls to correct any trouble.

Grinders in Minneapolis range from 24 to 81 years old, most of them between 40 and 60. Paid on an hourly basis, they make about \$3.36 for eight hours' work. The grinder must be alert and quick to detect and fix anything which goes wrong. The mill, running at tremendous speed, is turning out large quantities of valuable material requiring careful oversight, accurate testing, and prompt action. There is no figuring, reading, or writing involved, as the second miller keeps the records. Hardly any of the grinders have had any training in the theory of milling, or in technical and mechanical knowledge of their machines. They learn by experience all that present standards of efficiency require. The survey found millers, however, who believed that even for their present work grinders should know the mechanism of their machines.

A bolter has charge of the bolting or sifting machines. These machines contain gyrating or revolving cylinders covered with silk cloth having different sized meshes. These cylinders contain the wheat stock which, after each excursion to the grinding room, is

returned to the bolter for passing through the silk cloth to separate the flour. The bolter must test the broken wheat stock, see that it comes from the grinder in proper condition and notify the grinder when it does not. Sometimes the bolting machines take in too much stock at one time. This must be corrected by adjusting the slides which admit the wheat to the cylinders.

In small mills the bolter and the grinder is the same man. All that has been said concerning the grinder is equally true of the bolter.

In Minneapolis there are about 15 second millers. They oversee all the men engaged in wheat cleaning, grinding, or bolting. They are 32 to 71 years old, and work 8 to 10 hours daily. For an 8-hour day they receive \$3.36 to \$4.50. In some mills the second miller makes \$6 to \$8 a day of 10 hours.

The second miller must be able to plan ahead, manage men, and teach other men, and should have a fairly good common-school education. In smaller mills a record of the day's run must be kept. In all mills he must figure up the yield of flour in terms of the amount of wheat used.

He should be the best practical man in the plant outside of the head miller. To a thorough knowledge of all processes he must add skill in giving instructions to other people. Apparently he learns less of the whole business in a big mill than in a smaller one.

There are about 17 head millers in the city. This is the position for which ambitious men should aspire and for which they should be trained. It is commonly said in the flour business that "head millers are born and not made." They are undoubtedly picked men with exceptional native qualities of leadership, control over men, and executive ability, along with knowledge gained by years of experience. Probably no other business in the country is confronted with such a lack of men capable of promotion.

· TESTING DEPARTMENT.

In the testing department the flour from each day's run is tested and special problems as to quality of product are investigated. In addition, the miller makes every hour the "pelcar test," by which he can tell whether the mills run up to the standard set by the testing department for each grade of flour. There are only three occupations here—flour tester, chemist, and baker. These are so entirely different that there is no promotion or interchange of workers among them, and very few are employed. A head chemist and only three or four assistants are required for the chemical testing and research work of a large establishment; only three at most are needed for flour testing, and one baker is able to bake enough bread from the day's run of flour to test the millers' work.

There are about seven flour testers in the business in Minneapolis. They are 19 to 50 years old. The usual force consists of flour tester, assistant, and sample carrier. Pay is from \$10 weekly for the beginner to \$28 for the head tester. He tests the flour as to color, doughing properties, texture, volume, and absorption, and compares it with the best standards for the previous week, recording his findings. He needs good eyesight.

Most of those employed in this work have only a common-school education. The head chemists believe that the standard should be raised so as to obtain as beginners high school graduates with an elementary knowledge of chemistry. At present no technical knowledge is required from the beginner. He should know how to use delicate scales accurately, and be versed in the metric system and know the chemical composition of flour.

The testing room is used most frequently to train young men in a knowledge of flour so that they may be transferred to other departments. Skill in the work itself lies in ability to detect with the eye shades of color and to see by experiments whether the flour has the right elasticity, texture, smoothness, and absorbing power.

This skill is acquired on the job. From chemists with whom he is associated the flour tester learns some elementary things about flour chemistry, but no systematic effort is made to instruct him.

Flour testers lack elementary education and "fall down" in arithmetic, computation of weights, making comparisons, and keeping records. The business of testing apparently does not suffer from lack of knowledge or skill on the part of beginners. The loss lies rather in the failure of the young man to apply himself with the interest and intelligence which elementary technical knowledge of testing would give. The largest gain would come from the increased knowledge and grasp of these men when they go to other departments of the plant or become salesmen on the road.

Some beginners in flour testing come from the packing department and others from the outside. No special training is given save occasional instructions in ways of doing work. There seems to be no advantage in promoting from the mill to the testing room, save as the mill can be used as a training school in knowledge of flour. Superior ability is quickly recognized by promotion.

About 19 chemists are employed in testing flour. The usual staff consists of a head chemist with two or three assistants, receiving \$10 to \$35 a week, and 25 to 40 years old. Each day the run of flour is tested for ash and protein, and research work is constantly being done.

The chemist should be an independent investigator. He must have an A.B. or a B.S. degree, the latter preferred, and should

have pursued chemistry as a major subject in college. While there are some routine tasks, skill lies in taking a new problem and applying to it old and new tests. The new man must have adequate technical knowledge and must adapt it to the business by constant practice in routine and research work. These men do not lack scientific knowledge, but rather originality. Superior work is recognized by promotion in wage.

Only one baker is employed in the testing department of a flour plant. Bakers are considered separately elsewhere.

MAINTENANCE AND REPAIR DEPARTMENT.

Millwright helpers, millwrights, carpenters, and general laborers, including plasterers, machinists, plumbers, and steam fitters, do the construction and repair work. Because they lack the ability, only about two per cent of the millwright helpers ever become millwrights. A number of carpenters, however, become millwrights. About 75 per cent of the millwrights are brought up in the mill, serving in one position or another before promotion. Most of the carpenters are "picked up" from the outside. There is practically no interchange among the machinists, plumbers, and steam fitters, nor between any of them and the occupations just described. Some machinists are hired from outside, but the force is largely made up by promotion of helpers and laborers inside. Probably 25 per cent of the plumbers and steam fitters are helpers who have been promoted; the rest come from outside.

The millwright's helper in some plants is just a common laborer, who must be strong, have good lungs, and follow as one of a gang the directions of the millwright. In other plants he is considered an apprentice. He gets 25 cents an hour for an eight-hour day and is 30 to 40 years of age. In some plants as he progresses he receives 27 to 30 cents. He does rough work and does not need to know how to read, write, or add. In some plants he is promoted to be millwright because he is husky; in others, as millwright's apprentice, he may succeed to the millwright's position in time.

CARPENTERS AND GENERAL LABORERS, INCLUDING PLASTERERS.

About 61 men are employed under this classification. They are mostly young men receiving 25 to 35 cents an hour for an eight-hour day. The carpenter does rough work, repairing floors and windows. The plasterer repairs old ceilings and walls. Both are ordinary workmen, usually employed from outside.

The millwrights number about 12. They are 26 to 53 years of age and make 35 to 40 cents an hour for an eight-hour day. They set up and repair all shafting and machinery, and must, therefore, know how to work in both wood and iron. They must have good health.

Next to the miller, the millwright should be the keenest man in the mill. He must be able to meet quickly emergency repairs, plan his work, and direct a gang of men. Usually he is without a complete common-school education and has had no training in free-hand sketches, mechanical drawing, and mechanics. In three out of four cases he has grown up in the mill and learned every corner of it. His largest skill is ability to erect spouting, because of the peculiar angles at which the wheat stock must run. This requires an application of elementary geometry which he uses in practice, but of which he is probably ignorant in theory. All he needs to know to meet demands of the mill he learns on the job. Superior efficiency is recognized by increased wages.

MACHINISTS, PLUMBERS, AND STEAM FITTERS.

In the flour mills of the city about 20 machinists and 24 plumbers and steam fitters are employed. The former are about 30 years old and earn 38 cents an hour, and the latter about 32 years old and earn about 25 cents an hour. They are considered in the general study of their trades.

POWER DEPARTMENT.

Coal passers, firemen, engineers, and electricians work here. The flour mills of the city employ about 51 coal passers, 70 firemen, 37 engineers, and 17 electricians. The coal passer is usually young and strong, the fireman somewhat older, while the engineers are 30 to 50 years old. Usually the coal passer succeeds to the fireman's job, and the latter to the engineer's. The work of electrician is a distinct employment. The requirements in this occupation do not vary from those of similar ones in steam and electric power plants.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS OF SURVEY COMMITTEE.

These things are recognized by the milling industry as true of the business in Minneapolis at least:

(1) The standard organization of a plant or "mill" within a modern flour mill consists of about 10 unskilled or low-grade skill positions for every skilled position or desirable one from the standpoint of wage.

(2) Vacancies seldom occur in these better positions and opportunities of advancement are few.

(3) For reasons already given, comparatively few men who are capable of any considerable advancement are employed in the lower positions.

(4) This has led to the policy of looking almost entirely to the smaller mills in other cities for new grinders, bolters, and millers.

(5) These smaller mills select and train for the larger concerns new workers, who bring to the new position a practical knowledge of milling but who are as deficient as their new associates in any understanding either of the theory of milling or of the technical and mechanical knowledge in which the industry offers such a rich program of instruction.

(6) By practical experience a few men gain the efficiency necessary to meet present standards, at least in grinding and bolting and mill supervision.

(7) As the result of the absence of technical and mechanical preparation for these productive workers, the industry is to-day being improved not from within but from without, and "good" head millers and assistants not only are difficult to get but are lacking in the knowledge relating to the processes and the mechanism of the plant which is to-day regarded as necessary in positions of similar responsibility in other industries.

(8) The will creating the William Hood Dunwoody Industrial Institute provides a fund for use in giving "free instruction in the industrial and mechanical arts, with special emphasis on milling and the construction of milling machinery." The board of trustees of the fund in the discharge of its responsibilities is giving careful consideration to the question of what training might be offered for the flour and grist mill business, but so far no very definite plans have been formulated. No instruction of this kind for workers in the business has as yet been established in the United States, although such training is given in a number of schools in Europe. The only education for the milling business in the United States is that given in technical courses of college grade by a few agricultural colleges to small groups of young men preparing for technical leadership.

The general survey committee recognizes its inability in these circumstances to offer any definite recommendations as to the method of dealing with the situation in Minneapolis or as to what should be taught. It has, however, deemed it advisable to present in Appendix C of this report a somewhat elaborate memorandum of suggestions and possibilities as to what might be done, gathered from numerous sources during the progress of the survey.

CHAPTER XII.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR THE BAKING BUSINESS?

Bakeries rank sixth among Minneapolis industries. According to the census by the Civic and Commerce Association in 1914, the number of employees has risen since 1909 from 1,156 to 1,818, and the number of bread, cake, and cracker bakeries from 100 to 153. The demand for labor is increasing about 12 per cent a year.

The busy season is from May to November. Where five men are needed then, four are required during the dull season. The large bakery usually has a 10-hour schedule and operates two shifts, the small bakeries only one shift and longer hours.

The sources of new workers are numerous and varied. Many are foreigners and some come from the yeast companies. Formerly bakers were well organized, but now only 10 out of 153 shops recognize the union.

The baker's work is not hazardous, the trade ranking as one of the lowest in rates charged by casualty companies. There is considerable physical strain in some occupations and practically every position requires strong men. Oven men have to work near hot fires. Mixers should have strong lungs because of the flour dust. Rapidity of movement is required of all of them.

Well-trained men are scarce and the demand far exceeds the supply. In the small shop it is difficult to get a man who knows even the elementary things about testing raw material or the proper handling of dough. Lack of general knowledge and technical skill prevents advancement to better positions. The industry is greatly hampered by lack of knowledge or training of beginners. This is especially true in the mixing, dough-kneading, and baking departments. Most well-trained men are foreigners who have served their apprenticeship abroad. Unfortunately many of these are unable to adapt themselves to the American machinery of the plant. Many drift to small towns where they establish small shops in which they can best use their former training. Most American boys will not undergo the hard work necessary in learning the baker's trade.

There are comparatively few good positions in the bakeshop. The most important ones are foreman, assistant foreman, and head mixer. Of each of these there usually is only one to an establishment. Promotions are infrequent. The highest paid men, whose

number is small, earn \$960 to \$1,200 a year, while the foreman's salary is \$1,800 to \$5,000 a year. The wages of ordinary workers are \$10 to \$20 a week. There is no systematic line of promotion. Promising men are advanced to better openings without much regard to previous work.

Very little knowledge is needed to do the work of all save the foreman and head mixer. Strength, endurance, and obedience are sufficient in most positions. The head mixer should know the practical chemistry of bread mixing; the foreman also should know this and be a capable executive, but frequently lacks these qualities. Few foremen and mixers have been technically trained. The foreman is usually from the ranks of benchmen, ovenmen, and head mixers, the mixers from benchmen and ovenmen. The big gap between the untrained laborer and the head mixer or foreman must in some way be bridged over in the future if baking is to attain its possibilities as a scientific industry.

The small shop differs from the large plant in that one man must be able to perform all the operations, while in a large factory the work is highly specialized. In the small shop practically everything is done by hand; in the larger shop machinery is used wherever possible. Most workmen in a large factory need no special training. In general the larger bakeries provide direction by a few experts for the work of the men who have no technical training. The problem of the baking business is to develop out of this situation men equipped for leadership for the large shop and men who know the technology of baking for the small shop.

A full description of the baking business in Minneapolis and its needs as to vocational education requires consideration of four kinds of shops—the large bread bakery, the small bread bakery, the cake shop, and the cracker factory.

THE LARGE BAKERY.

The five departments of a large bakery include the storage, mixing and dough, kneading, baking, and packing and shipping departments. The mixing and dough department mixes the raw materials such as flour, sugar, lard, and salt according to formulas adopted by the shop. The dough is prepared in the kneading department, baked in the oven department, and shipped from the packing and shipping rooms. The mixing and dough, kneading, and baking departments are in charge of the plant foreman; the storage room, of the storekeeper; the packing and shipping rooms, of the head packer and shipping clerk.

The storage department employs helpers and stock keepers. The former number about 12. The helper assists the stock keeper in tak-

ing care of raw material, and his responsibility ends with the taking of orders. In age he is 21 to 45 years and earns about \$13 a week. He should be strong and know enough of arithmetic and reading to understand bills of lading and shipping tickets. In one week he can learn all that is necessary about the work.

The stock keepers, about 24 in number, do the same manual labor as helpers, and keep a record of all material going in or out. The stock keeper is usually of mature age and receives about \$18 a week. He must be able to write, read, add and subtract. With this exception, all he must know may be learned in routine. While drivers and helpers are often promoted to this position, as a rule an outside man is engaged. Men from the storage department are seldom transferred to other departments.

The dough department employs assistants and head mixers. The assistants, numbering 50, are usually "picked up" from the street. They sometimes become head mixers, from whose ranks foremen are usually taken. More frequently head mixers come from other plants.

The assistant mixer is 22 to 46 years old and gets \$16 to \$22 a week. He gathers and weighs materials, starts the mixing machinery and dumps the dough from the dough machine into the trough, which is then pushed into the fermentation room. He keeps the mixing machine and trough clean and watches the temperature and time of the dough. He should have good lungs and be accurate in weighing material.

In taking dough from the mixer, one must be quick and careful. To understand orders and record results of weighing and temperature, one must be able to read, write, and figure. Since foremen are recruited from mixers, it is important for the latter to acquire knowledge of baking, chemistry, accounting, and bookkeeping. Skill, which consists in accurate weighing and careful watching of temperature, is gained by an ordinary man in one week's service under a trained mixer.

The head mixer does work similar to that of the assistant mixer, whose work he oversees, and his age and wage are about the same. There are about 40 head mixers, usually promoted from the ranks and given a week of special instruction by the foreman. The head mixer's general knowledge should be about the same as the assistant's and his skill consists in keen observation of mistakes in the mixing. It takes him about a year to become thoroughly acquainted with the job. Chances for promotion are good and usually lead to foremanship. Superior ability is recognized by increased wage. The head mixer needs instruction in chemistry of baking, principles of accounting, business systems, and management.

The kneading department employs pan cleaners and sifters, machine tenders and bench hands. Pan cleaners and sifters, as a rule, become

machine tenders, who seldom become bench hands. The latter often become foremen.

The pan cleaners, of whom there are 50, keep a supply of pans at their machines, sweep the floors, and clean the pans by holding them over revolving greased brushes. Usually the pan cleaner is about 18 years old and receives \$12 a week. He must have endurance and quickness of motion. No general education is necessary. Speed and cleanliness are demanded. New workers serve with old ones a while before assignment to different operations. It takes six months to learn the work and chances of promotion are good. While no knowledge of the chemistry of baking is necessary, the pan cleaner needs it for the highest efficiency in advanced positions to which he is eligible.

The machine tenders, numbering about 65, operate the dough dividers, check accuracy of scales, and "pan" the bread. Ages are 18 to 24 years and wages \$10 to \$15 a week. The machine tender must be quick and active. Skill consists in speed and good judgment of proportions, since "a pound of dough must make a pound of bread." He needs elementary knowledge of weights, and ability to read figures and count loaves rapidly and accurately. Other knowledge required must be learned at the job. After serving with older hands from a week to a month, machine tenders are able to do the work. A general knowledge of the baking business would fit these men for more responsible positions.

The bench hands, who number about 150, cut the dough to the right size, roll it by hand into the desired shape, and place it in pans for baking. The average wage is \$16 a week, and the age 21 to 40 years. Rapidity and judgment in rolling out loaves to proper size are important. No general knowledge is required, but training in chemistry and business system would fit for promotion. These men usually gain experience in a small shop and are sometimes promoted to oven tenders.

The baking department employs practically only oven men, of whom there are about 40. These put dough into the oven by means of a "peal" and a long wooden shovel, watch the temperature, and take out the bread when done. Ages are 25 to 40 years. Wages average \$18 a week. The oven man must be able to endure great heat, and be systematic and careful in handling the long peal. Skill consists in speed of handling the peal. Most of the men have worked in other bakeries. While no education is required for present work, the oven man may become foreman and a course in baking, chemistry, and business system would be of great value.

The foremen, numbering about 45, manage the production of the bakeries. They have charge of the three departments, mixing and

dough, kneading, and baking, directly concerned with making bread. While usually he can not be promoted, the salary of the foreman is raised in proportion to the value of his services. He hires, retains, and promotes men, tests raw materials, keeps a record of production, and looks after the machinery. His most important work is care of the fermentation room and management of the men. His age is 32 to 55 years, and his salary \$30 to \$50 a week. Bakeries prosper largely in proportion as the foreman is able to organize and systematize the daily work and look ahead for new ideas.

Aside from the value of a knowledge of mechanics and machinery, he should have, in addition to a good general education, practical training in chemistry of baking and in business system and management, and he should be thoroughly acquainted with every step in the manufacture of bread, not only in his own shop but in other shops. To-day the baking industry is not producing foremen who combine technical knowledge with adequate practical experience. The new foremen are usually outsiders and are not brought up through the plant. Some maintain that "new blood" can accomplish things more efficiently than one who has been in the same plant for years. Foremen are usually selected for ability and trained in a six months' course by outside efficiency men. Only through opportunities to learn the technique of the baking industry can men with practical experience be able to meet the growing scientific and business demands.

THE SMALL BAKERY.

The small bakery, usually connected with a grocery store, produces cakes, pies, and breads for sale at retail. Only one or two men are employed, and the proprietor is often both baker and salesman. His problems as a foreman are in many respects like those of the foreman of the larger plant. In addition, he has to buy raw materials, sell his goods, keep books, and, in many cases, be his own driver. There are many differences in the method of operating a large and a small bakery.

The hand-trained man is especially valuable because every operation is done by hand. Consequently, the man in the small shop is really better trained and more competent than the usual benchman or oven man in a large plant; and the small bakery affords a better opportunity to learn all the operations of the industry.

Promotions are comparatively few and usually consist in getting a job in a larger bakery or in starting a shop. Wages are \$16 to \$25 a week. Night men get higher wages and competent men are in great demand. All that was said about the need of training for the large bakeries applies with equal force here.

THE SPECIAL CAKE SHOPS.

Special cake shops are connected with the larger grocery and department stores, and the work, both mixing and baking, is usually done in one large room. Four men are usually employed—foreman, first man, second man, and helper. The foreman's duties are like those in the large bakery, except that he does more manual work. The other men perform all the duties of a bakeshop carried on by hand. The first man must be able to do the foreman's work when he is absent. The second man follows the lead of the first man, while the helper, who is really an apprentice, must help wherever needed and has opportunity to learn every operation in the shop.

The cake shop is practically a duplicate of the small bakery; in both all the work is done by hand. The helper problem is the same because both must take on inexperienced men, although, as a rule, the workman in the cake shop seems to be a higher type. The helper gets \$8 to \$10 a week; the first and second men \$15 to \$18, the foreman \$25 to \$40. Promotions are usually from helper to second man, second man to first man, and first man to foreman. There is the same need of special technical training as in bread bakeries of every kind.

THE CRACKER FACTORY.

There are three large factories making crackers and cookies. They are organized into the same departments as the large bakeries and their work makes the same demand for better knowledge and training.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS OF SURVEY COMMITTEE.

For the year 1915-16, the Dunwoody Institute is conducting two classes in bakers' chemistry for benchmen, oven men, head mixers, and foremen. One of these classes meets Monday and Tuesday nights and the other from 10 a. m. to 12 m. Tuesdays and Fridays. The course, which was recommended by the trade, includes laboratory and lecture work on the following subjects:

Baker's chemistry: Structure of wheat and other grains, examination of flour for quality and quantity of gluten, color, absorption, moisture, stability, ash for impurities, baking tests for flour, blending of various kinds of flour.

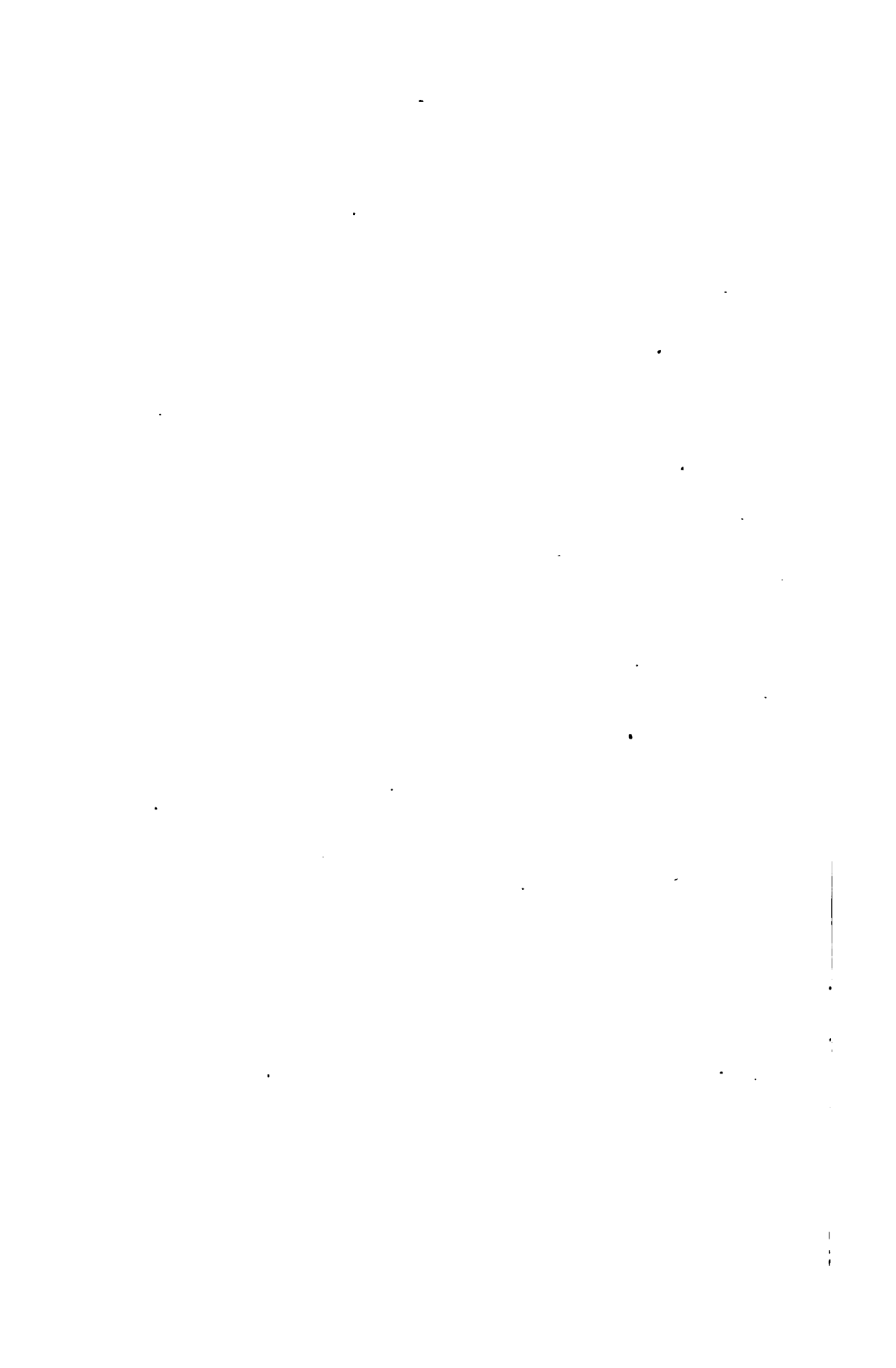
Yeast—nature, structure and life of yeast cells, fermentation of dough, gradual changes in dough, by-products of fermentation; lactic acid and other acid-producing bacteria and their by-products.

Baking powder, malt and malt extracts—the function of malt extract in dough. Patented preparation and compounds; pure

and impure salt; bread improvers; fresh milk; condensed milk. Fats: Lard and lard compounds. Temperature in dough making. Changes in dough during fermentation. Effect of "punching" dough. Proper and improper molding of bread, changes in dough while baking, steam in bake ovens, pressure of steam, study of various bread-making systems.

As a result of the survey it seems certain the Dunwoody Institute will at no very distant date establish a school for bakers as one of the important parts of its work. The trustees of the school are now considering the advisability of establishing a day school of technology of baking. Minneapolis presents a promising field for this enterprise. Baking stands second in the number of manufacturing establishments in the city, sixth in the number of employees, and sixth in the value of the annual output. The presence of the flour industry on such a large and prosperous scale gives opportunity for cooperation of the mills and the bakeries with the school, which not only will provide hearty moral support to this work but will furnish an opportunity in the mills and in the bakery shops for the students of the school to get a type of training in addition to their technical instruction in the classroom which few, if any, other cities in the country could provide.

The survey committee believes there is an opportunity in Minneapolis, through the Dunwoody Institute, to establish a national school of technology in baking, free to the youth of Minnesota, and open, at a very small cost, to the youth of the whole country who desire to be trained in technical leadership in the industry. The National Association of Master Bakers can render a great service to the craft and to the country by giving whatever support may lie in its power to the enterprise.



CHAPTER XIII.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR THE LAUNDRIES?

Like other large cities, Minneapolis employs many girls and women in its industries. Since all children under 16 must attend school unless they have finished the eighth grade, and since the State labor law forbids the employment of girls under 16 in most industries, practically no such girls are engaged in the productive industries of this city.

The number of women employed as wage earners in the manufacturing and mechanical industries, as reported by the United States Census of Occupations, 1910, was 8,000, or 15 per cent of the 53,250 wage earners in the city. At that time Minneapolis stood thirty-fourth among 50 cities having a population of over 100,000 in the per cent of women among the wage earners, Fall River first with 39.45 per cent, and Birmingham last with 7.45 per cent.

The survey was able to make a study of only a few of the many industries shown in the table. In some cases the employments are followed by men as well as women; in others they are carried on in connection with the occupations of men in the same plant. Wherever men and women were engaged in the same industry and men predominated, no attempt was made to study it separately for women. Many employments shown in the table, such as those connected with bread and bakery products, printing and publishing, flour and grist mills, furniture and refrigerators, photo-engraving, electrical machinery and supplies, are given consideration in the chapters which describe the situation without regard to the sex of wage earners.

In this and succeeding chapters attention is given to industries which employ women in large numbers and seem to offer profitable study because of the nature of the work and the opportunities presented to women workers.

Much of the employment of women is in processes automatic and easily learned, where the wage is comparatively low, and opportunities for advancement practically absent.

Believing that the first need was to get the real facts in employments having opportunities for both training and advancement, the survey selected for special investigation dressmaking, millinery, manufacture of clothing (including knitted underwear), department stores, and office work. Laundries were added because of the large number of women employed.

The difficulty always encountered in the study of women's occupations, that of getting satisfactory wage data, should be mentioned. The wages reported for the various occupations for women are approximated in this report and such factors as short days and short seasons are not taken into consideration, hence they can not be looked upon as standard rates such as are reported in the building, metal, and printing trades, in which, to a very great extent, a regular wage scale exists.

The accompanying table shows practically all the employment of women in manufacturing and mechanical industries in Minneapolis as reported by the Industrial Survey of the Minneapolis Civic and Commerce Association in 1914. This table concerns only manufacturing and mechanical industries as carried on in workshops and factories, but not laundry workers, milliners, dressmakers nor department-store workers, who are considered in this and following chapters.

TABLE 13.—EMPLOYMENT OF WOMEN IN MINNEAPOLIS INDUSTRIES.

[From Minneapolis Civic and Commerce Association Industrial Survey.]

Industry.	Number of establishments.	Employees.			Salaried employees and firm members.		Wage earners.	
		Female.	Male.	Total.	Female.	Male.	Female.	Male.
Hosiery and knit goods.....	7	1,995	357	2,352	69	207	1,926	150
Bread and bakery products.....	153	851	967	1,818	119	150	732	817
Printing and publishing.....	253	671	2,642	3,313	805	925	366	1,717
Clothing, men's, including shirts.....	20	640	407	1,047	13	89	627	318
Flour and grist mill products.....	22	607	3,657	4,264	201	496	408	2,161
Bags, other than paper.....	5	343	239	582	8	29	335	210
Paper goods, not elsewhere specified.....	6	252	175	427	16	38	236	137
Confectionery.....	19	250	196	446	22	61	228	135
Hats, straw.....	1	200	125	325	.....	25	200	100
Fur goods.....	17	93	201	294	18	15	75	186
Worsted, felt goods, and wool hats.....	4	120	172	292	9	5	111	167
Clothing, women's.....	6	110	10	120	18	5	92	5
Boots and shoes.....	4	76	276	352	14	51	62	225
Food preparations.....	19	73	263	336	6	67	67	196
Patent medicines and druggists' compounds.....	62	63	293	356	31	130	82	163
Leather goods.....	29	60	462	522	7	94	63	368
Boxes, fancy and paper.....	3	56	22	78	5	6	51	16
Mattresses and bed springs.....	5	55	340	395	4	72	51	268
Tobacco manufactures.....	52	48	800	848	3	43	45	257
Fancy articles, not elsewhere specified.....	5	47	29	76	2	12	45	17
Butter, cheese, and condensed milk.....	14	43	463	506	33	31	10	433
Needles, hooks, eyes, pins.....	2	43	47	90	3	3	40	44
Hats, other than felt, straw, or wool.....	7	32	6	38	7	2	25	4
Furniture and refrigerators.....	21	31	946	977	27	94	4	853
Boxes, cigar.....	2	29	20	49	.....	4	29	16
Awnings, tents, sails.....	7	29	75	104	2	21	27	54
Photo-engraving.....	10	25	189	214	15	10	10	179
Belting, leather, and hose.....	3	24	455	479	22	250	2	196
Coffee, spices, roasting.....	7	23	59	82	4	28	19	31
Blacking, cleaning, and polishing compounds.....	3	21	177	198	21	85	.....	92
Coffins and undertakers' goods.....	1	19	128	147	3	19	16	100
Flavoring extracts.....	4	19	47	66	3	13	16	34
Optical goods.....	5	19	50	69	18	16	1	34
Flags, banners, emblems.....	3	18	8	26	.....	3	18	5
Oil, not otherwise specified.....	5	18	165	183	15	59	3	106
Electrical machinery and supplies.....	13	16	260	276	11	30	5	230
Buttons.....	1	14	3	17	1	2	13	1
House-furnishing goods, not elsewhere specified.....	7	14	34	48	4	7	10	27
Sporting and athletic goods.....	2	12	10	22	.....	1	12	9
Paint and varnish.....	7	11	88	99	7	33	4	55
Mineral and soda water.....	12	11	170	181	5	19	6	151
Drug grinding.....	1	11	18	29	3	4	8	14
Pulp goods.....	2	10	177	187	.....	17	10	160
Looking-glasses and picture frames.....	12	10	65	75	9	20	1	45

The United States Census of Occupations in 1910 reported for Minneapolis 934 women employed as laundry operatives in laundries and 735 employed as such elsewhere, 2,999 dressmakers and seamstresses, 1,834 milliners, and 1,397 saleswomen.

Accurate wage reports for women's employment can not be made without an exhaustive census of workers or a study of pay rolls. There are many reasons for this, largely characteristic of women's trades. Among these are the seasonal character of work and constant fluctuation of earnings because of interrupted work, varying amount earned by the piecework system in the factory industries, absence of standard wage scales for store employment and the millinery and dress-making trades, and lack of trade organization through which statements of wages might be obtained.

Since a census of workers and a pay-roll study are time consuming and expensive, this report had to rely upon approximations as to wages, based upon statements from a wide variety of sources.

The laundry industry in Minneapolis probably does not differ materially from the same industry elsewhere. According to the United States Census there were 1,214 men and women employed as launderers and laundresses in 1900 and 1,669 in 1910, an increase of 37 per cent. The city directory for 1914 lists 112 laundries of all kinds, of which 35 are hand laundries operated by Chinese and the majority of the others power laundries.

Laundry work is not confined to any particular district. Though the larger establishments are somewhat centralized in the downtown district, there are hand laundries in all parts of the city.

Much of the active antagonism among competitors is giving way to business cooperation, and the so-called trade secrets are disappearing with the growing application of scientific methods. Laundry men are beginning to realize that their most effective competitors are their own patrons. This competition, however, grows less as the tendency to substitute machine for hand work increases and large scale production takes the place of the home industry.

The material of this chapter leading up to conclusions of the survey committee is presented under the main heads of (1) buildings, (2) physical condition, (3) hours, (4) organization, and (5) selection and promotion of workers.

BUILDINGS.

The laundry industry requires buildings with: (1) Construction which will bear the weight and vibration of high-power machinery, (2) ventilation which will carry off excess humidity and heat and feed in sufficient fresh air to keep the room comfortable and healthful, (3) floors from which water will drain readily, and (4) natural light, which is essential to acceptable and uniform production.

Laundry buildings in the city vary considerably in type. In many the necessary stability has been acquired by putting the mangle and washing machines in the basement, at the expense of light and ventilation, essential to good labor conditions. There are still in use many old, poorly constructed, badly ventilated buildings which can never be adapted to this industry.

Forced ventilation is the only adequate plan to carry off the vapor from washing machines and mangles. Most of the workrooms in Minneapolis are not so ventilated, and the heat is intense. Basement rooms are almost unbearable on a hot day. In cooler weather girls suffer from frequent colds, not so much from the heat in the room as because they go into the open air overheated and without taking time to change their clothing. Dressing rooms should be provided; at present they are rare.

The older buildings are frequently very poorly drained. The floors have not the necessary slope to carry off the water, nor are they so constructed as to dry quickly.

To obtain adequate light, some laundries have plate-glass windows on the street side of the workroom, which also serve as a means of advertising. When the show window is used the machinery is placed so that the operators may work without having their attention distracted by things outside and thus may avoid mistakes or injury.

Laundrymen are recognizing the importance of space, light, and ventilation, as is shown by the newer type of buildings which is replacing the old. Modern buildings equipped with modern machinery make possible better sanitary conditions, greater economy of human energy, and a more satisfactory product.

PHYSICAL CONDITIONS.

Besides the conditions affecting the health of workers, which vary with the character of the building, light, and ventilation, there are important factors inherent in the laundry industry itself. These are (1) handling soiled and infected clothing, (2) back strain from operating the treadle of heavy machines and lifting wet clothing, (3) overheating of the hands in ironing, (4) disease from hand starching, (5) risk from indiscriminate use of chemicals, and (6) danger from unguarded machinery.

This survey has not attempted to study scientifically the occupational risks in the laundry industry nor to check up conditions in Minneapolis laundries with those of other cities.

The lister and the marker are the only workers who come in contact with the soiled clothes to any extent. Laundries refuse to take clothing from placarded houses, but some dangerous diseases are not placarded. Clothing that is unusually soiled or suspected of

being insanitary is washed without being marked and listed. Bandaging all skin abrasions, washing the hands thoroughly before eating, and changing all clothing at the end of the day would reduce danger of infection to a minimum. It will be only a matter of time before laundrymen come to realize the danger of infection and insist on safeguarding their employees. The white uniforms provided for employees by some laundries are particularly desirable for the listers and markers.

All press machines are operated by treadle. Many are of the older type, requiring the operative to put nearly her whole weight on the treadle. In the newer machines the power is supplied by compressed air and only a few pounds of pressure is necessary. Many girls push the treadle down with a kick, which is as bad for machine as for operator. The use of the treadle in ironing and the extra pressure which the hand ironer exerts by throwing her weight on the iron add to the back strain from continuous standing. Muscular strain experienced by new girls in the mangle department passes away as the muscles become accustomed to this work.

Overheating of the hands due to constant holding of the iron has been somewhat reduced by modern types of irons. The disease from hand starching and risk from indiscriminate use of chemicals are discussed in Federal reports.¹ There are safety appliances which materially lessen the danger from machinery. Extractors should have lids which can not be opened when the machine is in motion, but very few so equipped are found. Mangles should have guards so adjusted that the fingers of the feeder can not be drawn under the rolls. Body and sleeve ironers and collar machines should be guarded in the same way. Heat deflectors should be put on the body ironers. Electric fans help to purify the air and cool the worker.

It is evident that there are few bad conditions inherent in the industry which can not be overcome, and the criticism to which laundry work has been subjected can be lived down as employers come to realize the value of healthful conditions and have regard for "safety first."

HOURS.

The regular working-day is 9 or 9 $\frac{1}{2}$ hours and the week 51 to 54 hours. There is little seasonal variation, but there is some variation at both ends of the week. The hours are from 7.30 or 7.45 a. m. to 5 or 6 p. m., with half an hour or an hour at noon. Work for listers and sorters is slack on Monday morning till delivery

¹ Report on Condition of Woman and Child Wage Earners in the United States, Vol. XII: Employment of Women in Laundries, pp. 25-37. Employment of Women in Power Laundries in Milwaukee, Bul. 122, U. S. Bureau of Labor Statistics, p. 16.

boys bring in the laundry collected. Starchers and ironers begin still later in the day.

Another general collection is made about the middle of the week and hotel and restaurant collections are made daily. This means a rush on Friday and Saturday, as all work must be finished and delivered by Saturday night, which frequently necessitates overtime for ironers, sorters, and delivery boys. Washers and starchers frequently finish by 2 or 3 p. m. Saturday. There is no difficulty in the hours of work as estimated weekly, but they may vary from 7 at the beginning of the week to 10 or more for the four middle days. This is more of a strain on the worker than the regular eight or nine hours throughout the week. Laundry men and factory inspectors are trying to do away with this condition.

ORGANIZATION.

The power laundry has four main departments: Office, engine room, laundry proper, and delivery department. In the office the amounts due on each list are computed and the bookkeeping is done. The engine room, as its name implies, is where the power is generated; some laundries buy their power and have no such department. The laundry proper is made up of the listing, marking, and sorting, machine and hand washing, starching, and the mangling, machine and hand ironing departments.

Office employments are dealt with under commercial work. Engine-room work falls under the machinist's trade, also considered elsewhere. This study, therefore, discusses only the laundry proper and the delivery department.

LISTING, MARKING, AND SORTING DEPARTMENT.

The listing, marking, and sorting department is somewhat analogous to the receiving and shipping department of a factory. The girls, working as a crew, receive, list, and mark soiled clothes and sort and assemble laundered clothing. The division of work varies somewhat, but is done, in the main, in the following way:

The lister opens the bundle of soiled clothes and lists the articles on different colored, printed blanks used to indicate different classes of work. In some laundries an inspector verifies this list.

The bundle and list are passed on to the marker, who sees that every article is marked with the proper symbols. She marks wearing apparel by hand with pen and indelible ink, and flat work on a marking machine resembling an adding machine, operated by lever and treadle. Hosiery is marked by affixing a tin marker or by pinning together with a safety pin. The marks must be placed uniformly so as to facilitate the work of sorting. Handkerchiefs and napkins may be placed in a marked net bag. When all the

pieces are marked they are thrown into bundles according to the classification, and the completed list is sent to the office to have prices inserted and costs computed.

Hotel work is listed separately and, as the quantity is usually large enough to fill one washing machine, it is put through in separate lots, a slip of paper bearing the owner's name going with the lot through each process.

The sorter assembles the laundered articles by the original lists, placed in alphabetical order in large pigeonholes as soon as received from the office. She puts them into the pigeonhole bearing the owner's list much as a mail clerk sorts letters. A checker goes over the list to be sure that all the things are there, and the bundle girl ties them up with the list outside ready for delivery.

The same general requirements apply to these three occupations. The girls must know how to read, write, and count. They must know the marking system in use, be able to recognize the symbols quickly, and place each article where it belongs. Accuracy, a good memory, and ability to think and act quickly are necessary. Good judgment is necessary for the lister, who must decide upon the classification of pieces not specified on the regular form. Much less than 100 per cent efficiency can not be tolerated, since the laundry can not afford to lose the confidence of patrons by the loss or misplacement of articles. The work can be learned in a few weeks. Young women with tendency to anemia or with poor lungs should not attempt the work of listing and marking, which involves risk in handling soiled clothing.

MACHINE AND HAND WASHING DEPARTMENT.

The machine washer, usually a man, loads into the washing machine the proper amount of clothing of similar kind, color, and degree of cleanliness and puts it through the washing and rinsing processes, usually five in number. For each process he measures the water, usually by automatic gauge, drains out each bath, and prepares the next. He measures the soap, regulates the temperature of the water, determines the amount of steam for the type of clothing he is washing, and measures the bleach and bluing. He starts and stops the machine, removes the washed clothes, and places them in a conveyer. For each process the standard formula worked out by the laundry is used and must be followed accurately. One washer may attend four or more machines.

The washer must know the formula for each type of wash; when to use alkali soap and when neutral; must add soap to the wash when the suds die down; and know to what extent steam should be reduced and the boiling time increased for badly soiled clothing. He must know when to avoid the use of bleach and bluing fluids.

He must be accurate in measurements, to avoid waste of soap and chemicals, or injury to the clothes.

He must have enough knowledge of the machine to use the gauge, start and stop it, and detect any irregularity which may injure the machine or contents. Ability to make simple adjustments or repairs is desirable and sometimes required.

The minimum educational requirements are ability to read and write simple English, follow oral and written directions, and speak intelligently, and a sufficient knowledge of arithmetic through fractions to be able to check up and account for work. The washer must be able to read the water and steam gauges and the thermometer. A working knowledge of simple chemistry is desirable, but only head washers have this, and they have acquired it by long experience.

Aside from putting the clothing into the machine and lifting it out again, the work is not heavy. The washer is liable to get wet, but well-equipped laundries avoid the danger of wet feet by using a skeleton superfloor. Men washers should have good health and strength and women more than average strength.

It requires six months' to two years' experience to become a good head washer. Workers begin with one type of wash, usually hotel work, and gradually take up other types. Only fairly mature persons are employed, the work demanding stability, judgment, physical strength, and ability to attend strictly to business.

In a laundry employing about 100 persons, there are about five machine washers and two hand washers. Head washmen are paid \$20 to \$30 a week; the few women employed, \$14. Assistant washmen receive \$12 to \$15 a week, and women assistants \$10 to \$12.

To some extent, delicate fabrics and silk garments liable to injury by the machine are washed by the old-fashioned rubbing-board method, though a small machine built for fine work, or a tun with a revolving brush which gently rubs off surface dirt, may be used.

The hand washers are usually women who have acquired some skill in their own homes, who know how to handle delicate fabrics and to wash and remove stains from fabrics of different kinds and colors. These women sort the clothes, look for and remove spots, and wash, rinse, and starch the clothes by hand. Less attention is paid to formulas for this than for machine work, though the general rules regarding soaps, bleaches, etc., apply here when fibers and colors are the same. Hand washing will be used only until a satisfactory machine has been invented for delicate fabrics.

There are no special qualifications for this work beyond physical strength and endurance and experience which may be gained at home. Middle-aged women are employed, at about \$8 a week.

Extracting is taking surplus water out of clothing after washing. It is done in a machine, consisting of an upright, perforated cylinder,

which revolves inside a solid case that catches and drains off the water. The extractor boy takes the dripping clothes from the conveyor as they come from the wash and packs them evenly in the cylinder. He closes the lid, presses a foot lever, and starts the cylinder, which revolves with such speed that the water is driven through the perforations by centrifugal force. He times each machineful as each kind of clothing requires a different time, according to thickness of material and degree of dryness desired.

The extractor boy frequently operates the tumbler, a perforated cylinder in which flat work that has become tightly packed in washing is shaken about until separated. This precedes the mangling and is sometimes done by one of the mangling crew. The operator of the tumbler loads into it a given amount of wet wash, closes the cylinder, turns on the power, usually by a foot lever, times the process, stops the machine, unloads it, and sorts the contents.

Rough-dry work is shaken out in the same way but the tumbler is inclosed in a cylinder into which sufficient heat is turned to dry the clothes. The extractor boy takes care of two to five machines, remembering what each contains so as to secure the right degrees of dryness. The hardest part of the work is lifting the dripping wash into the machine, especially such pieces as sheets and bed spreads.

The extractor boy must know the amount of wet wash that can be put into the extractor, and how to pack it so that the water will be removed without injuring the garments. He must know how to time and watch his machine and when to avoid touching it, although a safety guard in use in most laundries practically eliminates danger. He should have some knowledge of machinery, be able to read and write, and have sufficient knowledge of arithmetic to account for his work. He must be able to take and follow directions.

Wages average about \$8 a week. This position is usually filled by men 18 to 20 years old, as it is considered a step toward the more responsible and remunerative position of washer.

STARCHING DEPARTMENT.

There are three grades of starching—light, medium, and heavy—determined by the kind, amount, and thickness of the starch and the type of garment and fabric. Fine work is done by hand; collars and cuffs and shirts, for which there is a formula, are as a rule done by machine.

Starchers usually work in crews, each girl doing a special part of the work. The head starcher is the all-round worker and as a rule works with the girls she directs. She makes the starch according to the formulas prescribed, measures the ingredients, and attends to the cooking. She dips the garments requiring light starch and wrings

them out, usually by hand, without rubbing. She works in the medium starch by grasping the garment and rubbing it back and forth over the base of the thumbs. In heavy starching she lays the garment on a board and rubs the starch into the fabric with the finger tips, first on one side and then on the other, removing the surplus with a damp cloth.

Articles to be starched by machine are immersed in hot starch and fed into rollers resembling a wringer. The starcher stirs the article in the starch until thoroughly wet, removes it, smooths it out, and feeds it into the rollers which squeeze the starch into the fabric somewhat as it is rubbed in by hand, though less satisfactorily. The girl on the opposite side of the rollers hangs the pieces one by one on a moving line or puts a number into a receptacle, carries them to the drying room, and hangs them on the racks there.

The starcher must know how to follow formulas accurately and cook different kinds of starch satisfactorily. She must know the kind and amount of starch for each type of work and be able to determine when clothes are sufficiently starched. If overstarched, she must know how to remove the surplus.

This work requires good health, average physical strength, and deft hands. The head starcher must be capable of taking responsibility and managing people. No reading, writing, nor use of figures is required, except the reading of formulas by the head starcher. Starching is simple and can be learned in a few days.

In large laundries about 15 per cent of the force are starchers. The wages are about \$7.50 a week.

IRONING DEPARTMENT—MANGLING.

Flat work such as bed and table linen is dried and ironed by a machine process called mangling. The machines are a succession of padded rolls, revolving in concave chests heated by steam or against steam-heated cylinders, between which the articles are run. The work is done by a crew of three or more workers known as shakers, feeders, and folders.

The shaker's work is to prepare the clothes for the feeder. She straightens each piece and hangs it right side up over a pole, pillow slips in one group, towels in another, and so on. Two girls shake out large pieces, which they fold lengthwise and hang over the pole with the hem always in the same direction. This work is tiring to the arms and shoulders, and many girls suffer from stiffness during the first week. The work can be learned in a few hours. Ordinary intelligence, willingness to work, strength, and endurance are the qualities necessary.

The girls who start the clothes through the rolls are called feeders. They hang a pole piled with clothes on a standard between themselves

and the machine. Each takes one piece and, stretching it tight across the top, lays it on the feeding apron, keeping it smooth by pulling as it is drawn through her fingers. For large pieces like sheets, two girls work together. They draw the sheet tight across the top, push the sides outward as it goes through, smooth the bottom edge to remove wrinkles, and keep the hem straight so that the corners do not run out into "ears." Lists of hotel work are fed through before each bundle, and time must be taken between lots to feed over any pieces needing a second ironing.

This work requires almost constant standing, lifting, reaching, and stretching. New workers find it very fatiguing. No particular mental qualifications are necessary, as there is no accounting to be done.

The girls who take the pieces from the mangle and fold and sort them are called folders. The work requires less skill than feeding, but the folders must inspect each piece and hold over for reironing any piece that needs it. Frequently the head of the department is employed as a folder so that she may be finally responsible for the work. Some laundries employ an extra girl as table folder for the large pieces which come through too fast for the girls at the machine to fold neatly.

This work is less taxing than feeding, as the girls may sit at their work. In some laundries the feeders and folders work as a crew and change work, so that all are seated part of the time. The only skill required is neatness and speed. When workers acquire ability to keep the apron of the mangle filled to capacity, their speed becomes practically uniform.

Some of the larger laundries have a small mangle, called a handkerchief mangle for fine flat work, which can be better ironed in the mangle than by hand if not hurried through and pulled out of shape. It requires considerable care to keep large round doilies in perfect shape, especially when lace trimmed. Heavy linen pieces must be put through several times to dry them perfectly. The purpose of this mangle is to insure a high quality of work.

Since the girls in the mangle department work as a crew, practically the same qualifications are required for all. Although the shakers have little responsibility and their work makes few demands upon intelligence and skill, they should measure up to about the same standard as the others, for they are, as a rule, rapidly promoted. Physical vigor is the most important qualification, and some skill in handling the pieces is necessary.

The head girl or forewoman must have also the ability to take responsibility and manage girls. There are no definite educational requirements, but she must know how to account for work and take care of irregularities such as reironing pieces not satisfactorily done.

Frequently this department is managed by a foreman, who keeps the machinery in order.

About one-fourth of the force in a large laundry is in the mangling department. For regular work the wages are \$6.50 to \$7 a week. The head girl receives \$7.50 and men in charge \$14 to \$18 a week.

MACHINE IRONING.

Machine ironing is divided into three departments, collars, shirts, and ladies' wear, each having a special type of machine.

Collar ironing involves a series of machine processes and is done by a crew, one worker to each process, except dampening.

Dampening is an extremely simple process. One girl feeds the collars, as fast as she can handle them, into dampened padded rolls. Another girl receives them from the opposite side of the machine, puts them into a press box in even piles, and fastens the lid down with a hand press. They are left in this box for a half hour or more, to distribute the dampness evenly.

A third girl takes the collars from the box and feeds them into the flat ironer, a pair of rollers heated and padded, taking care to keep the collar in shape. This operative sits most of the time and can feed in as many as six collars side by side. The collars fall into a tray, and a fourth girl, usually the head worker, inspects them. Defective collars are sponged and smoothed by hand and reironed. The fifth operative lays the collars one by one on a feeding trough which carries them between heated irons where the edges are sprinkled and ironed. The sixth girl takes the collars from the tray of the edging machine and feeds them one by one into the seam dampener in preparation for folding. The seventh girl folds the collar over a mold the shape of the neck. The machine has four of these molds. By the time the operative has placed two collars on the forms, the standard turns automatically and raises the collars against a heated press. The other two molds are thus exposed, and she fills them while the first two are being pressed. The eighth girl places the collar on a similar mold and by means of a crank runs a hot iron over the folded edge.

The last four operations may be done on a recently invented machine which molds, finishes, and rounds the collar in a single operation. The number and division of processes may vary in different laundries. For hand-ironed collars the work is all done by one person.

Collar ironers are usually promoted from the mangle department. As a rule, all can run the machines, and they frequently exchange places. There are no specific requirements for the work.

In a plant with about 100 persons there are five collar ironers. The wages are about \$7 a week, the head girl receiving \$8.50.

Shirt ironing employs two distinct types of workers—machine operatives and hand finishers. The work of the former comprises yoke, cuff, neckband, bosom, sleeve, and body ironing. The subdivision into processes is determined by the complexity of the garment and the various types of machines which the laundry may have.

The yoke presser fits the yoke of the shirt on a shaped padded press bed and by means of a foot or pneumatic treadle raises the press bed and clamps it to the steam-heated metal plate which fits over it. She leaves the machine while she prepares another shirt, opens the machine with the treadle and repeats the operation.

The cuff presser lays the cuff straight on the press bed, so that the machine will iron exactly to the edge of the cuff. She closes the press, opens it almost immediately, turns the cuff, closes the press again, and leaves it while she performs the same operation with two other machines.

The neckband presser fits the neckband on the press bed so as to iron exactly to its edge, closes the press, opens it almost immediately, turns the band, inserts a thin metal plate under the buttonhole in the back and closes the press again. She removes the shirt from the press and inserts a collar button. She operates two machines.

The bosom presser draws the shirt over the press bed, fastens the collar band around a metal neck form, puts a metal strip over the buttons and under the buttonholes, clamps the bosom tight over the board, and smoothes it, brushing it with a damp cloth; then closes the press by a hand or foot lever, and leaves it while she prepares another shirt. She removes the clamp, buttons the shirt and, if the bosom is pleated, runs a bone instrument under each pleat.

The sleeve ironer draws the sleeve over a stationary padded roll which she raises against a revolving heated cylinder, and continues the pressure by a foot treadle until the sleeve is sufficiently ironed. The process is reversed by means of a second treadle, the girl ironing each sleeve forward and back two or three times. As it requires only a few moments to iron a sleeve, the treadle action is continuous and is relieved only during the short interval for adjusting another sleeve.

Body ironing is practically the same as sleeve ironing, except that the rolls are larger, and as the garment requires more manipulation the treadle action is even more nearly continuous, and the rest periods, while garments are being changed, are less frequent.

On the whole, machine shirt ironing requires more strength than any other laundry work. Excepting some bosom presses, the machines are operated by foot treadles and require constant standing. In the newer laundries they are equipped with pneumatic treadles, the pressure required is very little, and there seems to be no good reason why the girls should not sit at their work. Most laundries,

however, are not so equipped, and the operative must throw considerable weight on the treadle.

In the case of the presses, one pedal clamps the press bed against the ironing plate, and it remains closed until opened by the second pedal. In the ironing machines the padded roll is held against the ironing shoe or cylinder by continued pressure on the treadle. In other words, the operator gets the garment smooth by a hot-iron pressure as great as or greater than that exerted by the hand ironer, but in the case of the machine operation the exertion is transferred from the arms and shoulders to the legs and hips. Where the pneumatic treadle is used the roll is held against the ironing shoe or cylinder by compressed air, and the treadle action is by no means so exhausting.

In fact, these machines, when not equipped with the pneumatic treadle, are said to be the most exhausting to the operator of all the machines regarded as trouble makers in the matter of health.¹

Hand finishing in this department is the ironing of parts not satisfactorily finished by machine. The hand finisher takes the shirt after it passes through all the machine processes, inspects it, dampens and irons rough spots, and presses over the entire front. French cuffs, which are unstarched, are ironed by the hand finisher. This is fairly light work, as the garment is already dried and does not need heavy pressure. Folding the shirt ready for delivery frequently is done by the hand finisher. She lays the shirt, front down, on a table, lays a pasteboard on it, and folds sleeves and body over the pasteboard, turning in the edges and pinning all in place.

Ladies' wear is the third class of machine ironing. This work lacks the uniformity of shirt ironing, owing to greater diversity in the garments. Machines similar to those for body ironing are used, and some laundries have a machine built especially for skirts. Although not so specialized as the work of the shirt department, the ironers as a rule do only one or two types of clothing. The subdivision is determined by the number of workers and of machines and by the type of garment. The pieces are finished by hand and folded in much the same way as shirts. Owing to the variety of work, probably more judgment and greater concentration are required than in shirt ironing. Otherwise requirements are much the same, though the workers are generally a little more mature.

The wages for ladies' wear ironing are from \$8 to \$10 a week on a piecework basis.

HAND IRONING.

The work in this department is divided into two classes—ladies' wear, including a large variety of garments, and men's starched shirts. The workers on ladies' wear iron all garments not suited to machine

¹ Employment of Women in Power Laundries in Milwaukee, Bul. 122, U. S. Bureau of Labor Statistics, p. 21.

work, including babies' clothes and men's silk and flannel shirts and neckties. Middle-aged women who have gained skill at home are considered desirable by some laundries, as their judgment is good and their work uniform.

The work requires considerable skill, which can be acquired only by long experience. The great variety in shape and texture of the garment makes it impossible to formulate rules of much value. However, ironers tend to specialize, one doing silk shirts, another shirt waists, and so on. Concentration, neatness, and speed are the principal requirements, and the ironer must be reliable in the matter of not trying to hide imperfections. She must be strong in the back and shoulders. There are practically no young hand ironers. The age ranges from 20 to 40 years.

The head of this department may be an ironer or merely an inspector and sorter. Obviously her duties and responsibilities would be different in the two cases, but in either case she must sort the clothes for the ironers according to their specialties and inspect the work before it goes out. All poorly ironed garments must be done over. When the head of the department does no ironing, she sorts, wraps all special handwork, and at the beginning also lists special work. The requirements are the same as for the listing and sorting department, with the tact necessary to manage people.

Hand ironing of starched shirts requires more skill than any other laundry work. It used to be taught by an apprentice system, but with the coming of steam presses handwork was almost driven out of the industry, though it has had considerable revival. The life of a hand-ironed shirt is said to be about three times that of one ironed by machine. When the bosom or cuff is in the press, no air can strike it while drying, and the heat cooks the fabric. Moreover, the shirt looks like new after being ironed by hand, and is not pulled out of shape as happens if put carelessly into the press. In laundries maintaining hand shirt-ironing departments full-dress and fancy shirts are so ironed. Ordinary shirts are ironed by hand only at the owner's request.

Workers often are selected from hand ironers of ladies' wear or are experienced shirt ironers from outside. This is the hardest kind of hand ironing, as the irons used are very heavy, and it requires heavy pressure to give finish to shirts. Hand ironers must know how to keep the iron at the right temperature, and when the garments are damp enough and how to dampen dry spots. It takes from six weeks to three months for promoted workers to become skilled. The women doing this work are 20 to 40 years old. No young girls are hired, as they are not ready to take responsibility and are not strong enough.

The head ironer sees that lots are finished on time. He dampens all shirts by hand, as the machine sprinklers make them too wet. He

dips the body of the shirt into water, wrings it out, and folds the shirt so that all starched parts lie on the wet part. The shirts are piled in the press box and the lid fastened down by hand press. They are left from 2 to 15 hours, so that the moisture may penetrate every part. The head ironer opens the press and apportions the work. He rubs and wrings the starched parts to soften them; this is called breading. He irons all the full-dress and tuxedo shirts.

The method of ironing shirts by hand is much the same as that of machine ironing, though the order of processes is practically reversed, the body being ironed first. The head ironer teaches the new girls, helps all with their difficulties, and inspects practically all the work. The irons used vary from the best electric to rough-bottomed irons heated on gas burners.

Hand shirt ironers are employed in the ratio of 5 to 100 employees, and rates are about \$10 a week.

Knit underwear, also ironed by hand, requires very simple work. The garment is laid on the table and the iron pulled around on it without pressure or lifting. It is then buttoned and folded. Hose are ironed in the same way, or by being drawn over a heated metal form. The top edge is rolled back over the fingers to protect them. Beyond knowing how to keep the garments in shape and care in getting the iron over every part of them, there are no special requirements, and the work can be learned in a few hours. Weekly wages are \$8 or, on a piecework basis, a little more.

MENDING DEPARTMENT.

Mending is not, strictly speaking, a part of the laundry business, but is done in a number of Minneapolis laundries. Wages are \$7.50 to \$9 a week. The work may be done by machine or by hand. Neat and skillful mending is as much of an art as plain sewing; it requires skill, experience, and natural aptitude. There are only one or two menders in each establishment, and it is easy to find girls for the places. Frequently there is available some one who has worked in a garment factory or dressmaking shop. If there does not happen to be such a girl, one is selected who has done sewing at home.

FOREMAN AND SPECIAL WORKER.

The position of foreman or superintendent demands technical knowledge, executive ability, and business experience. In the smaller concerns the superintendent is the owner; in the larger, he is the most responsible employee. The wages are from \$30 to \$60 a week. He must know every piece of machinery in the plant, its operation, and its productive value. He oversees all work and usually works out the formulas for the starch and soap and for the washing

processes. He decides what softeners, bleaches, blues, and starches to use; this involves knowledge of chemistry and textile manufacture. He must decide whether time-saving methods produce fine work, and whether they will be profitable. He must be able to compute costs of machine and hand work and fix rates for piecework.

He has charge of hiring, training, retaining, and promoting workers, must have patience and firmness, and be able to inspire workers to put forth their best efforts.

As any serious dissatisfaction of customers is referred to him, he must be pleasing in manner and speech. He should read the laundry magazines and study machinery catalogues. Many capable foremen have worked their way up with only a common-school education. However, as laundry work becomes more complex, the advantages of special training are manifest. Courses in business and in laundry chemistry are generally desired for foremen by laundry owners.

Practically all large laundries have at least one worker who has no regular job but fills in where another worker is absent. She must therefore know all the machines and processes. Often she shows new girls their work.

Sometimes she is also a welfare worker among the girls. She listens to their troubles, helps them, and cares for them if they are sick or injured. The position is really that of assistant foreman, and in the foreman's absence she may hire workers. This position is a stepping stone to forewoman for girls with ambition, self-confidence, and some training. It is one of the best paid laundry positions open to women, the rate being \$14 a week. The "utility" worker usually has worked up in the laundry and is a little older than most of the girls because of her longer years of service. Little education is required, but she should be tactful, self-controlled, and skilled in different kinds of work.

DELIVERY DEPARTMENT.

The delivery boy is the salesman of the business. He deals directly with patrons and is therefore largely responsible for holding and extending trade. He must make the customer satisfied and meet criticism tactfully. This requires little knowledge of the business, but much of human nature. The usual routine is as follows: He takes a bundle of slips marked with his number or letter, and as each parcel is collected he puts a slip with it bearing the owner's address and notes of any special instructions. When laundry is delivered he collects the bill. He may be given some discretion in extending credit, but he is usually held responsible therefor.

It is impossible to present an accurate statement of the wages or earnings of the delivery boy. In some laundries he must pay all accounts not paid in two weeks. Also fines may be exacted for lost

articles. On the other hand, he may get a bonus for collection or his wages may be entirely on a commission or piecework basis. Usually the city is divided into districts and a driver's work is only in one section. He must know this section so well that no time is lost in hunting addresses. He must keep simple accounts, make change, and compute percentages if his laundry discounts for cash payment. He must be able to drive a horse or a machine.

Boys employed in this work may have begun with no previous experience or may have been drivers of grocery wagons. A pleasing appearance is a distinct asset, and honesty a strict requirement.

Only a common-school education is needed at the beginning, but much can be learned in routine work, and each year's experience adds to his efficiency; that is, he becomes acquainted with the customers, knows their peculiarities, and can tell the foreman just how they want their work done. As he becomes better acquainted with the district, he may extend trade.

SELECTION AND PROMOTION OF WORKERS.

New workers are employed by the foreman, who "sizes them up" on the grounds of general intelligence, experience, and character. Before taking in workers from other laundries, it is customary to confer with the previous employer. Some are taken on the recommendation of friends or relatives already employed.

Practically all workers are taken on trial. The first job depends upon age, strength, and experience. Girls under 16 are employed occasionally on special permits. According to public-school statistics, 3 or 4 per cent of employment certificates granted to girls under 16 are for laundry work. They are employed at shaking clothes for the mangle, as they are not permitted by law to operate a machine, and their skill and reliability is not sufficient for hand ironing.

Laundrymen do not like to take girls under 18. They are not strong enough to work in the better paid departments of washing and hand ironing; nor are they physically fitted to work steadily even at the simpler operations of machine ironing and starching. They also lack the poise necessary in minor executive positions. Ordinarily, they have not the power of concentration and application necessary to do marking and sorting.

There are three general types of workers in a laundry: Young girls who go into the mangle and machine collar-ironing department; girls who enter the listing, marking, and sorting department; and older workers who go into the hand washing and hand ironing. These types tend to gravitate to certain occupations and reduce to a minimum the interchange of workers. This may be partly due to the

fact that there is little difference in the wages of the various departments.

It is reported that 7 girls out of 10 in the mangle department drop out the first week, largely because of the monotonous work and the soreness from using muscles unaccustomed to such vigorous exercise. In this department most laundry workers are tried out; hence promotions to machine collar ironing are frequent. Older women rarely are employed for this work. The girls who enter as listers, markers, or sorters are generally the better educated and more intelligent. There is practically no promotion for these except to the office, and that is unusual. Older women are taken in as hand washers and machine hand ironers, because of their home experience.

Promotion from the mangle department to the machine collar-ironing department is common. Promotion from collar ironing to machine shirt ironing and other machine work is quite incidental, depending upon personal fitness. Such promotion brings a marked change in work, and as previous occupations have contributed little preparation, some training is necessary.

Promotion from machine ironing and hand ironing is infrequent, though hand finishers in the machine department may be promoted to hand ironing. This work is much more difficult and requires experience which even the hand finisher must work months to acquire, and as this work is paid for on a piecework basis it is difficult to induce finishers to make the change.

It is reported that girls do not care to be promoted to positions requiring more responsibility and skill. This is partly due to the fact that the increase in pay seldom equals the increase in responsibility. Girls go home when they are through early, instead of staying to learn other machines and prepare for promotion. As a whole, they expect to stay in the laundry only a few years. Laundrymen, like other employers, complain of inefficiency and lack of ambition, which affect more or less any scheme of promotion.

Examination of the demands made on hand ironers and on machine ironers shows that much more is demanded of the former than of the latter. It seems, therefore, that the most desirable positions are those of head worker of a crew or department and special worker of the plant. These involve sufficient responsibility to make them attractive to workers desiring executive positions.

The difference in wages, however, between the regular and the head worker is not enough to induce many girls to make special effort to qualify. On the other hand, the head worker in the mangle or machine collar-ironing department may earn more by going into the hand-ironing department, but as the work there is on the piece basis, she would lose the prestige gained as head worker.

SUMMARY OF THE SURVEY STUDY, AND CONCLUSIONS OF SURVEY COMMITTEE.

All the findings of the survey as to the laundries seem to point to the conclusion that it is neither desirable nor possible to give special training for laundry workers in the public school. All the employers and employees in the business with whom the matter was discussed are strongly of the same opinion. Indeed the Laundrymen's Club of the city, after some consideration of the matter, has practically gone on record as being opposed to any attempt to give special instruction for laundry work, either before or after workers enter employment.

The reasons back of this practically unanimous conclusion are many. Most of the work is performed by women and much of it is hard manual labor, although some knowledge and a kind of skill which no one has yet learned to describe is required in some of the operations. The chances for promotion in the business above the position of the skilled pieceworker are very few and the inducement in wages for even the best positions does not encourage many workers to make any special effort outside the laundry to obtain additional knowledge about the business.

It is, to a great extent, middle-aged women and untrained girls who leave the public schools as soon as they can that furnish the source of supply of laundry workers, and not promising young women who have given some time to vocational preparation because they find they can use the knowledge gained in more attractive fields. In these circumstances, trade preparatory or part-time courses for laundry operators are not feasible in the public schools.

It seems evident, however, from the study that there are some things to be taught about laundry work which would be helpful both to the worker and to the business. The knowledge which the laundry business so much needs and of which the laundry worker is usually so ignorant consists more especially of information as to the nature of textiles and fabrics and the best way to treat them in the laundry, and the practical chemistry involved in the handling of waters, soaps, bleaches, stains, and adulterations in the cloth.

The steam laundry which does its work on a large scale, in much the same way as other factories do their work, is an institution of very recent origin. So the laundry has learned to do its work almost entirely as a result of experience and by the use of rule-of-thumb methods, and it has not as yet given very much attention to the training of either its operatives or its foremen and forewomen. Laundrymen realize, however, that in order to promote the growth of the business much beyond its present state they must, to an in-

creasing degree, do work which so far excels that done in the home laundry as to make all housewives their patrons. For this reason they are now giving greater attention to improving their processes than ever before.

The survey is strongly of the opinion that for the present, at least, the power laundry must undertake the training of its own operatives. To do this it will be necessary for the foremen and forewomen of the laundries to be able to serve as instructors of helpers and apprentices. At present very few of the men and women in these directive positions are qualified for the task.

The school could probably best render service, if at all, by the establishment of unit courses in evening school for the instruction of foremen and forewomen on the technical side of the business, so as to equip them to be better directors, not only of processes, but of the proper selection and training of the workers who perform them.

CHAPTER XIV.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR THE GARMENT TRADES?

Excepting knit goods, the manufacture of clothing in Minneapolis has grown but little in the past few years. In men's clothing the number of establishments in 1909, as reported by the United States Census, was 17, while in 1914 the Civic and Commerce Association reported 20. There were 924 workers in 1910, and 1,047 in 1914. There are no figures showing increase in value of product. From a table prepared by the Civic and Commerce Association in 1914 the following data are taken:

TABLE 14.—INDUSTRIES IN WHICH MACHINE OPERATION IS CARRIED ON IN MINNEAPOLIS AND NUMBER OF WAGE EARNERS, BY SEX.

Industry.	Number of establishments.	Number of wage earners.		
		Male.	Female.	Total.
Bags, other than paper.....	5	210	325	535
Men's clothing, including shirts.....	20	318	637	945
Women's clothing.....	6	5	92	97
Fur goods.....	17	186	75	261
Hats, other than felt.....	7	4	25	29
Straw hats.....	1	100	200	300
Hosiery and knit goods.....	7	150	1,926	2,076
Furnishing goods.....	2	9	.....	9

The industries thus roughly grouped for census purposes may be reclassified as follows: (1) stock and custom-made shirts; (2) workmen's clothing, which includes overalls, pants, jackets, mackinaws, and fur-lined duck coats; (3) women's wear; (4) corsets; (5) hats and caps; (6) cravats; and (7) bags. Fur garments are made extensively, but the industry was not studied for this survey.

These industries have developed in Minneapolis during the past 10 years. Statistical information about them is meager, as it is only within recent years that they have been recognized as differing from other sewing trades; the United States Census and Labor reports have not treated them as a separate group, and until recently there was no organization of manufacturers to obtain data.

Seasonal characteristics are much the same as in other cities. With the exception of women's wear and mackinaws, a standard product is made for which the demand is practically constant, yet the yearly

fluctuation in number of employees parallels, as far as can be determined, the fluctuation elsewhere.

As compared with the same industry in other cities, the shirt industry is relatively small, though a number of shops do high-grade custom work, chiefly for the local trade. The largest single industry is workingmen's clothing, this city being a distributing point for a large farming and lumber region. There is a large and increasing demand for mackinaws and fur-lined duck coats used by lumbermen and other workers. The manufacture of women's shirt waists, skirts, and dresses is scattered, there being no large factories and none making any but the cheaper lines. The corset, hat, cap, and cravat industries are recent developments. The manufacture of cotton and jute bags, which supplies the large milling industry of the city, is an important industry.

Factory industries use practically the same scheme of organization, which falls under (1) office, including accounting and correspondence; (2) production, or the factory proper; and (3) sales, including advertising. This study deals exclusively with production and the possibility of training workers for occupations within that branch. Hence office work and sales are not here included.

There is a similarity in the subdivision of the work throughout the branches of the industry, but although all use electric-power sewing machines and, to some extent, the same methods of cutting and sewing, they differ greatly in materials handled, in types of processes, to some extent in machines used, and in character of the product. These points as to machines and product are the largest factors in the differentiation, and so important that not more than one or two lines are found in the same factory. When carried on under the same management, different lines are made in different departments, which in reality are separate factories.

Other points of difference little known by the layman are the different types of mechanical ability, manipulative skill, and use and control of machines required for the materials used in the various lines. The person skilled in handling heavy materials which require a firm touch rarely becomes skilled in handling finer or more elastic materials, while one accustomed to handling the lighter fabrics handles heavy materials with difficulty.

The product of all the garment industries is made of textile fabrics, which go through somewhat similar processes. Every industry has a cutting and a sewing department. The latter is subdivided into machine and hand sewing departments, and nonoperating departments for such work as examining the finished product, and pressing, folding, and packing. Since there are recognized differences in the various branches and workers go from one to another only incidentally, each industry is discussed separately.

OCCUPATIONS COMMON TO ALL GARMENT-MAKING INDUSTRIES.

There are, however, certain occupations common to all, which vary in the amount of responsibility, the bulk of work handled, and the time spent on each piece rather than in actual duties and operations performed. These are cutting, buttonhole making, button sewing, examining, pressing, and packing.

The demands upon these workers are practically the same in all lines. Though important factors in each industry, their similarity warrants separate discussion preceding the analysis of the seven lines of the garment trades included in this report.

CUTTING.

Cutting is the most important and responsible work in the manufacture of ready-made clothing. It demands accuracy in measurements and ability to lay out different garments so as to save material, for an inch saved on each one of the hundreds of garments turned out represents much money. As the head cutter is usually a designer, a thorough knowledge of style and of the lines of the garment, and planning the garment to suit the cloth are important, demanding training and long experience.

Cutting comprises designing, spreading, marking, and actual cutting. These are done by separate workers, the cutter doing them all only in shops which handle small quantities of work.

The spreader lays the cloth in piles ready for the cutter. He is usually a learner or apprentice, acting as assistant to the cutter. He spreads the cloth on the table, layer after layer of the same length, according to estimates worked out by the designer or head cutter, until as many as needed have been piled up. Sometimes only one kind of cloth is used, but frequently the spreads are of different colors or kinds of material. The spreader smoothes out the wrinkles, keeps the stretch of all piles uniform, and sees that edges are carefully laid together.

Spreads that are laid too loosely can not be cut satisfactorily and the garments will vary, while those stretched too much tend to be undersized when made up. One spread may contain several garments, determined largely by the length of the table and the number of garments to be cut. Factories as a rule prefer a long table so that many garments may be cut from one spread, thus reducing waste.

When the spreading is done, an assistant lays the pattern on the cloth as diagramed by the head cutter. He marks around each piece with chalk or pencil and repeats the process till the entire surface of the top spread has been used. The pattern is then removed and the work is ready for the cutter. Marking is less

responsible than designing or spreading, for the worker handles only the top piece of cloth and if not properly done, the chalk may be brushed off. The same assistant may assemble the parts of the garments after cutting and put them in bundles ready for the work-room. The young man wishing to become a skilled cutter gets his first idea of the requirements through this work.

The cutter, who is a full-fledged mechanic, does the actual work of cutting. He uses a hand knife or the electric cutting knife and follows the chalk or pencil lines closely. To cut a number of layers requires strength, a steady hand, a good eye, and knowledge of all parts of a garment. It involves considerable responsibility, as careless or inefficient work may mean the loss of large quantities of valuable cloth.

The cutter must know the kinds, qualities, and variations of goods, and width and shrinkage. He must be able to design patterns, plan the layout on the cloth, draw a diagram of the same for reference, and figure estimates so as to get the greatest number of garments out of the cloth. These estimates, as a rule, are carefully checked before a style is decided upon. He must know how to lay the spread, mark the cloth, match stripes or designs, use the hand and electric cutting knife skillfully, and grade patterns to stock sizes.

The educational requirements are a fair knowledge of reading, writing, and arithmetic through fractions, sufficient to figure yardage and estimates dealing with both length and width of cloth, and a knowledge of drafting, involving some mathematical principles. Since the spreader and marker are in a sense apprentices to the cutter, they should have capacity to learn the cutter's work. The requirements, therefore, differ in degree rather than in kind. The marker and spreader may be 18 to 20 years old. They rarely become head cutters under at least four or five years' experience, though two years is considered the term of apprenticeship.

Since the cutter stands practically all the time and bends over his work, he should have good health and endurance. He should have good eyesight and a steady hand in the use of the knife.

BUTTONHOLE MAKING.

Buttonhole making is practically the same in all branches of the industry except for the adjustment of stitches, regulated by the machinist who looks after repairs. Two types of machines are commonly used, one operated by hand and the other by treadle. On some products the worker spaces the buttonholes as she operates the machine, but on the more expensive work the spaces are marked by an assistant. The operator places the cloth under the presser foot,

starts the machine, which makes the number of stitches required, and stops automatically, and takes out the finished work.

The worker must know how to set the buttonholes parallel in the cloth and, although the stitches are made and placed automatically, she must watch the operation and stop the action of the knife which cuts the buttonhole if the thread breaks or stitches do not fall in line. As buttonholes are not easily mended, the work requires constant attention. In some lines the operator may have to handle each style of garment, and, therefore, must read directions, but when only one kind of work is handled, no reading is required. She accounts for her work with a coupon which involves little or no writing. She should understand English well enough to follow directions. The work requires steady nerves because of the chopping sound of the knife in the cloth.

Hand-made buttonholes are used only on exclusive products.

BUTTON SEWING.

Buttons are spaced by the machine operative or an assistant, usually the former, since she is guided by the buttonholes already made. She inserts a button in a slot in the presser foot of the machine, places the garment in position under the foot and starts the machine, which puts in the desired number of stitches, ties and cuts the thread, and stops automatically. A good operative can sew on about 390 dozen buttons a day.

Buttons are clamped into working clothes and overalls. The worker puts the garment under the foot and starts the machine, which places the button, pushes it through, and clamps it to the cloth. Buckles or large snappers are put on in the same way. For the better grades of clothing the work is done by hand.

The requirements are practically the same as for buttonhole making, but the responsibility is not so great.

EXAMINING.

In every industry the finished product is examined before it is pressed and packed. This consists in looking for imperfections and clipping off loose threads. It requires a knowledge of how the garment should look when completed, the department to which imperfect work should be returned, and the skillful use of scissors in clipping ends quickly and closely without injuring the garment.

The examiner sits at her work, as a rule, and therefore needs only average strength. She must have good eyesight and skillful fingers. The work is done by girls just entering the industry or by older women who can not stand the strain of sewing or pressing. Although it does not prepare for other occupations in the factory, the experi-

ence is valuable, and an observing girl may pick up considerable knowledge. The requirements vary in the different industries largely with the value of the product rather than as to specific demands on the worker. There is little need for reading, writing, and arithmetic, except where examiners must keep a record of the work. In modern factories the coupon system is used.

PRESSING.

Pressing is done by hand and by machine. On light fabrics, used for women's wear, cravats, and, to some extent, shirts, a hand iron is used, though frequently shirts are put through the processes used in the laundry.¹ Much light ironing is done by women. Duck coats, mackinaws, caps, and overalls require less careful pressing, but the work is heavier. Some are folded and pressed on the steam pressing machine, others by hand. Pressing custom clothing is the most highly skilled and specialized pressing. Pockets, flaps, collars, sleeves, and so forth, are pressed before the coat is put together; all seams and second pressing, called under pressing, are done after the assembling; and a third pressing, called over or top pressing, after all sewing is completed.

The pressing on hats and caps also is specialized, a steam-heated block and iron being used.

Clothing and hats are pressed by men who serve an apprenticeship in each line before becoming top pressers. For these jobs there is a recognized scale of rates, ranging from \$8 to \$12 a week for the part presser. Work may be done on a piecework basis or by the week.

Strength and endurance are necessary, especially on treadle machines. Workers must know how the finished garment should look and how to press it so as to keep its shape and freshness. In custom work pressing is an important factor in shaping the garment.

PACKING.

Packing, though relatively unskilled, is an important part of every garment industry. It consists in folding and laying the garments in boxes according to size and style, tying them in place with tapes, inserting paper covers or advertising matter, and closing the box. In some factories the number and size must be stamped on the box. The workers are responsible for packing only perfect products, being expected to discard or send for repairs any not perfect, and for the condition of the finished package, but the product has already been so carefully checked up that the responsibility is slight.

¹ See Chapter XIII.

Girls stand at this work, as a rule, so it requires a fair degree of strength and endurance. In most factories they move back and forth, which gives variety and relieves the strain. An elementary knowledge of reading and writing is required and sufficient knowledge of arithmetic to account for the garments they handle. The work can be learned in a few days. Personal neatness and care in handling the garments are required. The lighter product is packed in cardboard boxes, usually by girls 16 to 20 years of age, though some older women are employed. The boxes are packed in heavy cases by men and boys in the shipping department.

The executive positions in all lines of the garment trades demand practically the same types of ability, the difference being in the size of the plant and the complexities of the problems. These positions are manager or superintendent and foremen and forewomen. In small factories the head man may be superintendent and manager; in large plants these may be two persons—a manager and a superintendent—responsible for the management of workrooms, production, and business methods.

SUPERINTENDENT OR MANAGER.

The superintendent or manager has charge of the larger details of production. He is responsible for the use of raw materials, quality and quantity of output, production methods and costs, and policy of the factory in employing and dealing with labor. In some factories he employs and dismisses workers, though in large factories this is delegated to foremen or forewomen.

He must have: (1) Knowledge of the details of manufacture, for which reason managers are men who have "grown up in the trade;" (2) ability to arrange and manage a building so that space may be used to the best advantage and the convenience of workers; (3) knowledge of cost estimating of materials, labor, and production and of elimination of waste; (4) ability to get along with people through factory discipline without coercion.

He is responsible, as a rule, for reports of all departments to the office. His position demands a knowledge of fundamental business transactions and sufficient general education to keep up with the demands of the industry and understand trade conditions. When style is a factor in the product, he must keep in touch with the fashions.

FOREMAN OR FOREWOMAN.

The foreman shares the responsibility of the superintendent and usually has charge of a department. His largest responsibility is looking after the progress of the work as it passes through the department. He is responsible for the quality and quantity of

work turned out, and, as a rule, the personnel of the workers. In large factories the work of the foreman or forewoman is clearly defined, but in small factories the duties may be many and varied.

The forewoman teaches beginners, frequently works at a machine, and assists in or directs the inspection. Foremen, as a rule, delegate these details to an assistant. The forewoman is, generally, a worker who has had long experience in the rank and file and has acquired thorough knowledge of the product. She knows the processes and can pass judgment on all work turned out. In some factories she helps to determine the type and grade of product.

The person in this position should know how to get along with people, how to keep work moving without delay or confusion, and how to keep workers busy without waiting for rush periods. A fair education is necessary, although many have picked it up while working in the trade.

SHIRT-MAKING INDUSTRY.

In Minneapolis there are shirt-factories, which in the majority of cases are stock factories also, and which employ approximately 200 workers. This does not include the office and shipping force, nor traveling salesmen. The industry has not increased noticeably in the past 10 years, but manufacturers say that it has more than held its own. Stock factories supply the wholesale trade, while in the custom-shirt industry traveling salesmen solicit trade and the garments are made to order.

The custom-shirt factories are small, the owner being invariably the manager and often the designer and hand cutter. Larger factories have a general superintendent, whose duties are mainly executive, and a foreman who usually acts as designer. The greater part of shirt making is machine work, though on custom shirts a few workers are employed for embroidered initials, eyelets, and hand-made buttonholes. The bulk of the employees are cutters and machine operators.

Though the processes are not classified in the factory, and division of the work is made on the basis of convenience in getting it through, the processes fall under two general heads: Construction of the garment, and mechanical operations contributing chiefly to the finishing. The constructive processes are yoke and sleeve setting, seaming or joining, and putting on the collar band. The mechanical processes are front and sleeve facing, bosom and cuff making, and attaching and hemming.

Collar making is very exact work, but mechanical rather than constructive. Processes in collar making are seaming, stitching, and collar setting or stitching to the neckband when the collar is made

separate from the shirt.¹ The number of processes is sometimes reduced by omitting one row of stitching.

Yoke setting is stitching the two parts of the yoke to the back of the shirt. It is done in one operation. The back of the shirt is laid under the presser foot between the parts of the yoke and a plain seam is stitched across—joining the three together and distributing the gathers. The operative may or may not turn the yoke into position after the seam is stitched and run a row of stitching along the seam for finish and strength. She must know how to lay the parts together, and the amount and place of the gathers, though the work is sometimes done on a machine which scatters the gathers automatically. She must be able to read the tickets and the coupons which she cuts from the tag. Practically no other demands are made upon her. Although fairly simple, this work is seldom intrusted to the younger workers. Aside from knowing how to control the power and thread and take care of the machine, the operation can be learned in a few days.

Shoulder joining is relatively simple. It consists of joining the front and back of the shirt with a flat-fell seam. The worker inserts the front between the two parts of the yoke at the shoulder, matching stripes when necessary, and stitches it in a two-needle machine which turns the cloth in as it passes. She must know how to hold the parts so that the edges may not fray out or stretch. There are no requirements but a fair degree of alertness, intelligence, and speed.

Sleeve setting is considered an important and difficult process. In shirt making the work is done on a flat-bed, two-needle machine which turns in the edges of the cloth and puts in the two rows of stitching in one operation. The operator takes the shirt after the shoulder seams are stitched, lays it over the top edge of the sleeve, lapping the two just enough for the seam and turn in, inserts the edges in the attachments which turn them in, and guides them under the needle. As the armhole is nearly straight and the sleeve somewhat sloped, the two edges do not feed in evenly, hence the process requires manipulative skill and judgment, as too much cloth plaits in and too little frays out. It requires higher intelligence than the foregoing operations, as the skill required varies with the material handled and the process never becomes so mechanical as to be done without judgment and thought. Educational requirements are probably a little higher for this occupation; physical requirements are the same.

¹ This division applies to small custom factories. When collars are made in great quantities, as in some of the custom factories, the processes or operations may number as high as twenty-five.

For convenience and speed, as many operations as possible are done while the garment may be laid flat on the machine. In shirt making, the yoke and front facing are put on, shoulder seams sewed, and sleeves set in before the underarm seam is joined. Joining is done on a two-needle, cylinder-bed machine which closes body and sleeve in a single flat-fell seam. The operative laps the two edges about a half inch, inserts them in the double feller attached to the presser foot, slips body and sleeve over the cylinder extending in front, and guides the work so as to keep the turn in even.

The operation is simple or difficult according to the cloth used, firm cotton cloth being easy to handle and silk and light-weight madras requiring considerable skill. The garment is only slightly shaped, so this seam has less effect on the shape than in shirtwaists, coats, and dresses.

Putting on the collar band is probably the most difficult operation. The worker sews the band to the shirt with a plain seam or, when the lower edges of the band have been turned in by another operative, in one stitching. She must keep the seam of uniform depth, and stretch or hold in the curved part of the neck. The distance from center to shoulder seam must be the same on both sides to insure the right set of the finished garment.

This worker must know how the finished shirt should look and how to correct imperfect work, such as unequal spacing or seams of too great depth. Depth of seams is sometimes regulated by a gauge, relieving the worker of that responsibility.

Front facing is putting the box plait on the front opening of the shirt, and hemming or facing the edge which goes under. The worker stitches on the strip that forms the box plait, turns it back, turns in the edge, and sews a row of stitching a quarter of an inch from each edge, finishing the bottom with a row or two of stitching. On cheaper shirts the plait is put on by a special two-needle banding machine which does it in one process. This worker may finish the underside of the front, or that may be done before the garment is given to her.

The operative must know which side the plait should be on and feed the work into the machine so that it will be of uniform width.

Some shirts have a tucked or plain bosom made and set into the body of the shirt. The material is tucked in lengths. The bosoms are cut out and are set into the shirts with a flat-fell seam on the side and a facing across the bottom. The same worker may make the front plait and facing. Seams are straight; there is no shaping. But stripes, plaids, or figures must be matched.

The sleeve placket or opening is made before the seam is joined. The worker hems the under edge, sews, turns, and faces down the

placket strip, and finishes the top with a triangle of stitching for strength. It is a simple process and is given to beginners. The worker must put on the placket so as to have sleeves in pairs when finished.

Cuffs are made of two outer plies and an interlining of shrunken muslin. The worker stitches these together on the wrong side, turns the cuff, stitches it to the sleeve, distributing the gathers, turns in the edge and stitches it down, and puts a row of stitching for finish and firmness around the cuff about a quarter of an inch from the edge.

The bottom of the shirt is hemmed by an ordinary hemmer attachment. The worker puts in a narrow hem and inserts with it the gusset used to strengthen the ends of underarm seams. The work requires considerable skill in making a narrow hem on a curved line.

WORKINGMEN'S CLOTHING.

OVERALLS, PANTS, AND JACKETS.

Minneapolis has approximately 300 persons in seven establishments making overalls, pants, and jackets, the remainder of the 1,047 workers reported by the Civic and Commerce Association in 1914 being scattered about in small clothing factories which help to supply the local clothing houses. In most of these factories the same workers make all three garments. In one a separate group makes pants, as this work is considered more particular and requires more skill. These are the "jeans" for workingmen and are but one grade removed from common overalls.

Overalls are of several grades, from boys' brownie overalls, the cheapest and simplest, to a high-grade bib overall of the best material and having more trimming. Overall making is less specialized than other garment industries and takes less skill than is required to make shirts and women's wear.

The work in this industry requires considerable strength, as the garments are heavy and cumbersome and the machines cause vibration. The principal occupations are seaming, pocket making, joining, sleeve setting, closing, hemming, collar and cuff setting, and the making of trimmings such as patch pockets, straps, bibs, flaps, collars, and cuffs.

The greater part of the operation of seaming is done on a cylinder two-needle machine. It consists of sewing together the inner seams of overalls and pants and usually follows the setting of the pocket, done while the garment can be laid flat. It is practically the same as shirt seaming, the difference being in handling heavier material.

Both patch pockets and set-in pockets are used in overalls, pants, and jackets. Patch pockets are made and set on by a worker using, as a rule, a two-needle flat-bed machine. Set-in pockets are made as fol-

lows: The sewers seam the pieces and turn the raw edges in. They insert the top edges of the pocket through the slit, stitching slit and pocket together on the wrong side, pull the pocket through the opening so that the raw edges are on the wrong side of the garment, and stitch around the opening on the right side to give it firmness. This is the most skilled operation on these garments.

When the pockets have been made, leg seams stitched, and flies put on, the two parts are joined. This is usually done on the two-needle machine, which fells the two bias or shaped edges and makes two rows of stitching in one operation.

Sleeve setting is done on a two-needle machine and is practically the same as in shirt making except in the weight of the cloth.

Closing is sewing the underarm seam of coat and sleeve in one operation on the two-needle cylinder machine, as in shirt making.

Hemming, usually done by an attachment to regulate the width, requires less skill than in shirt making. The hems are short.

In cuff setting the sleeve seam is partly closed, then the cuff is stitched to the edge, the lining turned in, and the second row of stitching made. This is usually done on the cylinder machine, and may be done by the person who joins the underarm seam.

The making of trimmings is the simplest work. It is usually given to beginners, who make the parts for the other workers.

MACKINAWs.

These garments are made of coarse, thick, woolen cloth, and take the place of an overcoat. They are not lined, so the pieces are bound with bias cotton cloth. The collar is semitailored, and pockets may be either patch or set in. The principal occupations other than those common to all the industries are binding, yoke stitching, body making, sleeve making, and pocket making.

In binding, the cloth and binding are placed under the presser foot, the binding through an attachment which folds it the exact width, and the worker guides the cloth so that the binding will be stitched over the edge. The work varies with the shape of the piece, the bias and irregular edges being the more difficult.

Yokes are stitched to the backs and sometimes the fronts before the garments are assembled. A single-needle machine is used.

Body making is assembling the parts of the garment. This worker puts on the pockets, stitches on the yokes, sets in the sleeves, sews on straps, and stitches the outside facing. The processes may be given to different workers. Body making requires mechanical ability, for the operative must know how to put the parts together. The setting of the sleeves and collar requires the most skill.

In sleeve making after the parts have been bound the operative puts on an imitation cuff and sews up the seams. The sleeve is blind-stitched at the wrist with a special blind-stitching machine, which is also used for padding the collar.

FUR-LINED DUCK COATS.

These consist of a heavy duck outer coat called the "shell" and a lining of sheared or beaverized sheepskin. They may have a fur collar, made of wombat or river muskrat. The outer and inner parts of the coats are made separately and by different operatives.

Operations on the duck coats are similar to those on underjackets. The fur linings are made by fur operatives on special fur-stitching machines and the two are put together by workers who understand how to handle both textile fabrics and fur.

Requirements are very much the same as in the various lines of workingmen's clothing with the exception of fur sewers and cutters. Workers should have good health and the strength and endurance to handle large quantities of rather heavy work. The sewing is simple and coarse and does not demand much finish. The reading, writing, and arithmetic actually required is very slight.

WOMEN'S WEAR.

This branch of the industry is small, there being at the time of the survey only from 50 to 70 workers in the factories making women's ready-to-wear clothing. The product is confined to house dresses, aprons, kimonos, bathrobes, nightgowns, shirt waists, bloomers, middies, and bathing suits. It may be termed a "filling-in" industry, supplementing rather than supplying the city's trade. Practically no two factories make the same line. The operations are much the same as in shirt making, and requirements for the most part are similar, but there are special operations, such as rick-rack sewing, hemstitching, and tucking, not used in any other line.

The work involves variations in construction and processes, which demand greater adaptability on the part of the worker than in the branches making a standard garment with few changes from season to season. Even sleeve setting and collar setting, which are paralleled in shirt making, show differences involving more responsibility for the shape of the garment. For some of these operations such as seaming or joining the overlock stitch is used, which makes the operation different from seaming a shirt. Seams are made also by use of a hemmer presser foot, a different operation from the plain, flat-felled seams in other garments.

Hemstitching is done on a machine built for the process. It has two needles and puts a row of stitching on either side of the hole made

by the plungers. The work is usually done by a specialist. The machine is complicated and the work must be carefully guided, the machine giving little assistance in carrying the work along. The process is slow as compared with plain stitching, as several stitches are taken in each hole.

The operative puts the cloth under the presser foot, stretches and holds it under the foot, and guides it so as to have the hemstitching fall in the line required. The operation is not very difficult when done on muslin or lawn, but on cotton voiles, chiffon, and lace materials, that stretch or pucker if not properly managed, it requires a great deal of skill.

The ability to handle different materials and to keep the work in line are the main requirements. There is no constructive work except where the garment is put together by hemstitching, and even then the parts usually are joined first by a plain seam. The machine is complicated but not more difficult to manage than other two-needle machines.

Educational and health requirements are the same as for the other occupations in the industry.

Tucking is done on a single-needle machine by means of a special attachment called an arm, which folds the goods, measures the width of the tuck, and marks the edge of the next. The work is almost entirely manipulative, and presents the same problems in handling materials as does hemstitching. The chief requirements are close attention and ability to manage difficult fabrics in the machine.

Tucking and hemstitching fluctuate in popularity and are too specialized for any but those who care for manipulative work.

CORSETS.

From 25 to 50 persons are engaged in corset work in Minneapolis. Most of them are in factories, but a number do fitting or altering in department and other stores. Both standard stock and custom corsets are made.

Difference in size and shape is slight, though so important in the finished garment, and small errors are serious. Some of the work demands, therefore, a high degree of accuracy. Ability to handle work without stretching the cloth applies in corset making to an even greater extent than in the other garment trades, except some parts of shirt and collar making, chiefly because of the importance of accuracy in sizes.

The main operations are designing and cutting, done by men as a rule, one-needle or two-needle joining, putting on backs, bone tacking, binding, and putting in eyelets. Among the minor operations are boning, trimming, and tacking on belts.

Designing corsets differs from designing other garments, requiring a more thorough knowledge of the human figure. The recognition of the corset as being conducive to health, comfort, and good appearance, and the demands of short and tall, stout and slender, long-waisted and short-waisted figures, have made corset designing of considerable importance. In some cases there is cooperation with physicians and nurses in constructing corsets on hygienic lines. Corsets do, however, conform more or less to the demands of styles for outer clothing, hence the designer must be informed on the season's styles. The designer tests the styles, grades, and sizes, and makes the patterns. The spreading, marking, and cutting are done as for other garments.

Joining is the process by which the garment is put together. It determines its shape, and is done by the most skilled workers. A two-needle or single-needle flat-bed machine is used, as described under shirt making.¹ Usually one piece of cloth is cut on the bias or shaped and the other is cut straight, but sometimes both pieces are somewhat shaped. The edges do not feed in at the same rate unless carefully regulated by the operator, who stretches or holds the cloth in place, which helps in the "set" of the garment. The operative must keep the parts in pairs so as to have a right and left for each garment. This involves reversing the work under the presser foot, which frequently is quite difficult.

Putting on backs is stitching on the back strip which holds the bones and eyelet strip. Aside from using a four-needle machine, and watching that the eight threads run without breaking, the process is simple. Guiding the work is easy, as the garment is straight and the material is sufficiently stiff to feed under the presser foot without the assistance of the operative.

Stripping consists of putting on the casing for the bones. The strips are put on the wrong side after the parts have been joined. The strip and an interlining are carried from a roll hung over the machine through guides to an attachment on the presser foot. The worker places the strip and guides the work slightly as it passes under the foot, cuts the strip when the stitching is done, and repeats the process. She has four threads to watch and occasionally puts new rolls on the holder. Although done on the two-needle machine, it involves much less skill than two-needle joining in which the amount of cloth fed in determines the finish of the seam.

Binding also is somewhat automatic. The binding is fed under the presser foot through an attachment, and the worker inserts the edge of the corset in the folded binding and must keep the edge in the binding and under the needle at uniform depth.

¹ See p. 332.

Putting in eyelets is a machine process that may be considered automatic with the exception of moving the part along under the attachment which punches the hole and clamps the eyelet in place. A guide on the machine assists the worker in spacing. The machine, started by a treadle, puts in the eyelets at short intervals until the required number are in place. It is a simple process, but is intrusted only to responsible workers, as the eyelets must be evenly spaced and once put in can not be removed without spoiling the strip and involving considerable repair work, if not loss.

Boning is putting the bones into the casings made by the strips. The work is done by hand by young girls and requires no skill.

Bone tacking is stitching across the strips after the bones are in place. It is done on a single-needle machine and is simple though tedious because of the short rows of stitching and the constant turning of the garment. The skill lies in stopping the machine when only a few stitches have been made, which is considered by operatives to be more difficult than stitching long seams.

Tacking belts, sewing on lace, and running ribbons are hand processes. The belt on the inside of the corset is tacked in place. Lace usually is sewed on with long running stitches. Except for keeping the work fresh and clean and getting it done speedily, the work has no specific demands.

The requirements for all operations are practically the same except for designing, cutting and joining, which require intelligence, judgment and skill. The operations are not complicated and the materials used are light and easy to handle. There is little demand for reading or the use of figures except in measuring the garment from time to time to see if it is being kept to size.

As for all machine sewing, which requires long hours of sitting, corset workers should be strong and free from tendency to stooped shoulders and narrow chest. Good eyesight is necessary, especially in operations that must be watched during their progress.

CAPS.

The cap industry in Minneapolis employs about 30 workers. The majority of places listed as hat and cap manufacturers resew the straw, renovate and reblack old hats.

Cap workers are almost exclusively foreigners who have learned the trade in Europe. The industry is handicapped by lack of trained workers; as one worker makes practically the entire cap, inexperienced workers can not be used to any great extent.

The processes are relatively few. Cutting is done in much the same way as in the other industries, though planning layouts and figuring estimates is simpler. Making and assembling the visor, crown, and lining are the machine-sewing processes. Sewing on but-

tons, putting in labels, and sewing in sweatbands are done by hand and are little more than basting processes. The hand sewing is done by the examiners, who inspect the work, check up sizes, and insert the label giving the size. All caps are blocked or pressed.

The operative makes the entire cap, usually by the single-needle machine. He joins the crown pieces, seams the visor pieces, inserts the stiffening and stitches it in place, sews visor to crown, makes the lining, puts it in, and stitches it in place around the edge. When caps are not lined the edges of the cloth are bound or taped, usually by the aid of an attachment which carries the tape and holds it in place while the stitching is being done.

In the blocking and pressing the cap is steamed and pressed over a block to give it a finished appearance and to shape it.

CRAVATS.

The cravat industry is small, and the persons employed are very few. The work is light and the operations are simple. The fabrics used are chiefly silk, which require careful handling and must not be wasted. The main operations are designing and cutting, hemming, joining of pieces when cut in two parts, inserting the interlining, stitching the back, and pressing. Designing and cutting present the same problems as in the other industries discussed.

Hemming, done on a chain-stitch machine by means of a hemmer foot, is the most difficult operation. Much of the work is bias, requiring considerable skill. Materials vary so much that the operative must learn continually how to handle them well.

Seaming is sewing the edges of the tie together in the form of a tube. This work requires stretching the tie so that when turned it will be the right length. As ties are made to standard neck measures, this requires accuracy and considerable judgment, for the materials used vary in weave and stretching qualities.

Joining or making the short seam is plain stitching. Inserting the canton-flannel interlining is done with a steel rod which has a pointed end to hold the flannel as it passes through the tie. When this is done, an operative puts two rows of stitching across the back of the tie to hold interlining and label. These processes are simple and may be learned in a few days when the worker has learned to control the machine.

Pressing is done by hand with a light iron. Girls may be seated.

BAGS.

In numbers employed, bag making is one of the most important of the sewing industries. It furnishes bags to the flour mills of the city and employs about 700 men and women, chiefly foreigners who have

been in other sewing industries. The present number is less than average because of business depression.

Burlap, jute, and cotton cloth are used. Although sewing is done, the industry does not belong to the needle trades, but is more nearly allied to shoe stitching.

Cutting is done by men. The rolls of cloth are spread by a carrier and the electric cutting knife is used. Layouts are estimated as in garment making, but are much simpler, as all pieces are rectangular. Rapid work is a large factor in this type of cutting.

Bags are seamed on a bag-stitching machine, which makes a locked chain stitch. The bags are run through in rapid succession, as little effort is required to guide them. Seams must be well made, as the bags are for flour, bran, etc., which may sift out of imperfect seams.

The stitching is practically continuous, and the worker handles a great number of bags in the course of a day.

The wages of workers in the garment industries are not standardized as are those of carpenters, electricians, or machinists, and wage reports are difficult to obtain. Several important factors affect earnings, making accurate data practically impossible, except in two ways—gathering reports from a representative number of individual workers, which presents serious difficulties, as few keep a weekly record, and studying the pay rolls of firms.

These factors are: (1) the unstandardized system of allotting work, known as the section system; (2) the piecework method of payment for practically all operations which lack uniformity and standardization; (3) varying hourly rates for work that can not be measured by each separate task or volume of work; (4) seasonal demand for product, which affects the hours per day and weeks per year employment may be depended upon.

Weekly wages of garment workers in other cities,¹ as far as can be determined, parallel wages in this industry in Minneapolis. The following table shows the wage rates in this city as reported through interviews held during the survey:

TABLE 15.—WEEKLY WAGES OF PIECEWORKERS IN GARMENT INDUSTRIES, MINNEAPOLIS.

Industry.	Weekly wages of pieceworkers.	
	Range of wages.	Average wage.
Shirts.....	\$5. 00 to \$12. 00	\$8. 00 to \$10. 00
Workingmen's clothing.....	9. 00 to 15. 00	8. 00 to 10. 00
Mackinaws and fur-lined jackets.....	8. 00 to 23. 00	12. 00 to 14. 00
Women's wear.....	6. 00 to 10. 00	7. 50 to 8. 00
Corsets.....	5. 00 to 8. 00	6. 50 to 7. 00
Cravats.....	6. 00 to 12. 00	7. 00 to 8. 00
Bags.....	6. 50 to 13. 50	8. 00 to 9. 00

¹ See Bulletins 135, 145, 146, and 147 of the United States Bureau of Labor Statistics, and Report on Conditions of Woman and Child Wage Earners in the United States, Vol. II.

Wages of cutters are practically standardized; apprentices get \$10 to \$15 a week and cutters \$18 to \$25. Most foremen are paid \$15 to \$25 and forewomen \$10 to \$18. Variations in the wages of foremen and forewomen are marked; there is no standard scale, rates being determined by individual bargain.¹

Earnings are further affected by fines imposed for bad work, but no factories, so far as could be learned, pay a bonus for good work or recognize in any way high-grade or uniformly good work. Unlimited piecework encourages overspeeding, yet more work a day is the only way the worker may increase her earnings or her value to the employer.

The garment industries, like all others, build up a reliable business by making a good product of uniform quality for which they must depend to a large extent upon the individual worker. Much has been done to improve machines, but the fact remains that garments can not be made without skilled hands and, in many instances, intelligent thought and technical knowledge. Furthermore, a product which is uniformly good, which includes no discards and no pieces to be repaired, has commercial value over and above the regular piece rates. Workers able to produce such must have not only a high degree of skill, but the ability to detect imperfections in the fabric or the work as it passes through their hands. Experience in other cities shows that giving of special rewards for the best work is a good business proposition. Managers and foremen admit this, and the fining system further verifies it, but thus far little thought has been given to the developing of a system that will encourage workers so to qualify.

SELECTION AND PROMOTION OF WORKERS.

Workers are hired and dismissed by the manager, though this may be delegated to foremen and forewomen. The age of young applicants is usually verified by a written statement from parents or the school attendance office. Questions are asked about earlier employment and reasons for leaving it, family responsibilities, and, in the case of older workers, previous experience. Frequently, however, the one question is, "Can you run an electric-power machine?" In times of stress, workers who can run a foot-power machine are employed.

Alertness, intelligence, neatness, good health, and reliability are the main things kept in mind when taking on workers. Nervous girls are not employed if it can be avoided. Experienced hands are given work which they have done before, but untrained boys and girls are placed at random (except in positions demanding

¹ Highest rates are for fur work.

strength and vigor, for which only the more robust are selected) and given barely enough instruction to enable them to undertake one simple operation. In a few days, or weeks at most, they are expected to shift for themselves. Practically no thought is given, so far as can be learned, to ascertaining what jobs beginners should be assigned in order to get the rudiments of running a machine, handling fabrics, or putting the garment together, or to a rotation of work which would give a knowledge of several operations.

The number of workers so selected and placed who stick to the work and make good is variously estimated as 1 in 5, 2 in 7, 1 in 10, 1 in 2. In spite of this tremendous waste of workers' time and employers' money, few managers study this problem, attributing it to carelessness and indifference.

The shifting of workers is credited to restlessness and worthlessness. This may apply to older persons who have acquired the habit of not sticking to a job, but can not justly be made to characterize young people who have not been long at work. Employers have made practically no attempt to compare the facts as to the shifting and failure of workers in the various occupations with the specific demands upon their skill and intelligence.

Every employer knows that he employs during the year many more workers than he needs at any one time. Thus far, however, he seems to have thought of this problem only in the aggregate. Closer study of the demands of the various occupations upon the workers' skill, intelligence, and energy would throw considerable light on the need for training workers for the more difficult processes as well as on the vexed question of obtaining for the various lines of work persons fitted for their jobs and willing to stick to them.

Promotions in the garment industries are incidental. Foremen and forewomen, as a rule, have served at the bench, but promotions in the lesser positions are infrequent. Indeed, piece rates are so regulated that weekly earnings are about the same for all processes; hence, little inducement to change is held out to the workers and many managers believe that it makes for greater skill not to transfer them from one process or operation to another.

No garment factories in Minneapolis have a system of training, but new workers are "taught" by a forewoman until one process is fairly well understood. There is some incidental shifting within the department if they fail to make good on the first operation, but practically no interdepartmental shifting. Some managers think it wasteful to let workers go when other departments might provide work they can do well; others think that to shift workers from one department to another "tends to breed dissatisfaction," since gossip is carried and may be misinterpreted.

The **section system** prevails in all except the small custom-shirt factories employing only a few workers. When work is sent from the cutting table to the workroom, the parts of the garments may be put into separate bundles, the sleeves, body, and collar of a shirt being made in three different sections of the factory and later assembled. Another way is to wrap several garments in a bundle, which is sent from section to section, each worker in a section doing her part on each garment. So the work proceeds from group to group, the garment being assembled as it goes along.

While the section system insures the largest output and, some managers think, the most uniform product, it limits each worker to a narrow task unless she is shrewd enough to realize its limitations and seeks to broaden her work. In a very few instances this is done within the factory, but generally the ambitious workers go from place to place seeking work of a different and, if possible, a more highly skilled type. Foremen complain that girls do not care to change from one operation to another, but a study of seven branches of the industry fails to show any incentive for change beyond a weekly rate based upon past earnings in the work already mastered and bringing the same return on the piecework system. With little hope of increased earnings and no assurance that they will make good at the new operation, girls naturally do not care to take the risk, especially as wages are so low that any falling off means serious loss.

The **piecework system** is used extensively. Rates for the different processes are based on the amount of stitching to be done and the time required, though some account is taken of such factors as starting and stopping the machine at short intervals. Practically no manufacturers, as far as can be determined, take into consideration the greater skill and intelligence required in putting the parts together, which is clearly constructive work. As these processes determine to a large extent the shape and set of the garment, it would seem fair that they be considered on a different basis from those more mechanical.

Inquiry into the difficulties met in obtaining workers shows that the positions requiring construction are the most difficult to fill, and the workers have the most trouble in making good; yet these frequently command lower piece rates than the more mechanical and less responsible processes. Nearly all managers and foremen say that the best section workers, excepting very simple work, are those who can put the entire garment together, their knowledge of the way a finished garment should appear being a great help. Such workers also are more willing to shift from one operation to another and have a greater chance to succeed.

In spite of the fact that all-round workers are rapidly diminishing in number, not one employer in Minneapolis attempts to train any. It may be profitable to make the product only by the section system, but the admission that all-round workers are needed in the factory opens up questions as to the training of workers for such positions, if not for the lesser jobs.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS OF SURVEY COMMITTEE.

In the foregoing pages of this chapter a line of distinction was drawn between the constructive process of garment making where the worker has an opportunity to affect the form and shape of the garment by the quality of her work, as in the case of cutting, seaming, and sleeve setting, and the finishing processes where the worker adds to the finish of the garment, as in the case of seam covering, binding, and stripping by machine—operations which are easily learned and at which speed is gained in a short while in the performance of the task. When a girl enters the garment factory she usually is assigned to a process of one or the other of these two kinds.

The assignment is more or less accidental, as very few factories recognize the difference in the character of the two classes of processes, with the resulting difference in the opportunities and demands upon workers. The constructive processes call for thought, judgment, knowledge of the mechanism and use of the machine in carrying out these processes, and a higher order of skill than is required of the worker in finished processes.

While in general it might be said that in the case of most of the finishing processes no special training by a school seems to be necessary or advisable, there are some finishing processes of a high grade, such as buttonholing, hemming, and tucking, where previous experience gained in the school would undoubtedly be of large advantage to the girl in gaining proper entrance to the factory and the best opportunities for wage and advancement in her employment.

The work of these finished processes when taught by a school could very readily be combined with instruction in the constructive processes. In this way the pupil could be doubly equipped as a wage earner.

All those engaged in the garment trades in any way with whom the matter was discussed believed that there was a need for a school to give training in the constructive processes of garment making. They were all of the opinion that under present conditions this training should be given to the girls before they entered the industry.

None of the employers was seriously interested in part-time day classes for employees.

The reasons for their attitude are not peculiar, but are, on the whole, the same as those reported in other cities. It was recognized by the better employers at least that training of their workers by the part-time school probably would not and should not result in an increased output by the worker. These employers recognized that results came rather in such other and more important things as keener interest in work, greater understanding of trade processes, better methods of performing operations, an improved product, and larger adaptability of the employees. Most employers are, however, not sufficiently convinced of the value of the school training for the garment industries to be willing to go to very much trouble or expense in cooperating with the part-time class.

Such a class would mean that the employer must pay for the time spent at the school, as the worker could ill afford a cut in wage. There are also problems of organization and administration to be solved where workers are sent from a plant to a school for instruction. These problems are peculiarly hard to solve in industries like the garment trades, where the piecework system is employed as the basis for the assignment of work and the pay of the worker. Furthermore, the section system is probably carried further in the garment industry than in any other. The garment, or parts of it, is passed along from one worker to another, each of whom does some one thing upon it which is necessary to the finished article.

The absence of the worker from the machine must either halt the process or require the temporary employment of a substitute to keep the work moving.

Many persons conferred with were doubtful whether very many workers would see opportunities for wage advancements in evening classes in trade processes, though they favored such classes and believed they should be tried as a means of reaching those already engaged in the industry.

As a result of conferences held during the survey, a trade understanding was arrived at similar to those understandings worked out for the other trades of the city. According to this plan, girls are to spend the first three months in the course in machine operating at the Girls' Vocational High School as a probationary period, so as to find out whether they have interest and fitness for the work. Those thus selected are to be given the remainder of two years' instruction in academic and trade subjects, half the time to actual practice in trade processes. After this the girl is to be placed in the trade at a beginning wage of not less than \$8 a week, and the diploma is to be withheld for one year until she has presented proof of satisfactory service to the trade.

The plan contemplates an advisory committee made up of employers and employees in the trades to aid the school authorities to make this course thoroughly practical and successful.

The Garment Workers' Union has approved this arrangement and the association of employers in the garment trades, which was organized as a result of survey conferences, has also approved of the plan and its members have individually agreed to use the school as a source of supply for their workers.

The board of education has approved of the arrangements as described, and has appointed an advisory committee to assist the Girls' Vocational High School in this work.

CHAPTER XV.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR DRESS-MAKING AND MILLINERY?

DRESSMAKING.

Minneapolis has about 200 dressmakers engaged in custom work. Approximately 15 per cent do exclusive custom dressmaking, and the rest are in smaller neighborhood establishments or are seamstresses. A branch of the trade which has grown very much in the past 10 years is the altering of ready-to-wear dresses and suits.

Although the number of workers employed is difficult to determine statistically, it is undoubtedly true that it has increased materially in the past few years. Several things point to this conclusion: (1) Dressmakers report that they make one to two more gowns each season for many of their permanent customers; (2) many persons who a few years ago considered the homemade dress satisfactory are now regular patrons of the custom dressmaker; (3) increased sale of ready-to-wear dresses and suits calls for many more workers in this line of work.

Dressmaking establishments are found in all parts of the city, though the larger shops are somewhat centralized. Those which cater to a rich and ultrafashionable clientele are found in private houses, the parlors being used for display and fitting rooms. Large numbers of others are in the business blocks of the city, with attractive display, fitting, and work rooms. A few are in department stores, and still others cooperate with millinery stores, where display rooms are used for exhibiting hats as well as gowns and wraps.

Smaller shops in the outlying neighborhoods are for the most part in the owners' homes. As a rule these cater to women who dress conservatively and spend considerably less for their clothes than the women who patronize the more fashionable shops. Seamstresses represent still another type. They are employed by the day in the homes of their patrons, where their work supplements that of the dressmaker, usually in the way of remodeling dresses that have been worn. They may do all the dressmaking for families of conservative tastes and moderate incomes. Departments in which ready-to-wear dresses are altered to fit the buyer are found in practically all stores selling ready-made apparel.

The small dressmaking establishment in which the dressmaker with one or two assistants carries on a small business is rapidly passing out of existence. The dressmaker who does business on a large scale has taken the customers who must have clothes to suit their individual tastes and figures, and the factory has taken those who find in the great variety of ready-to-wear garments release from the time-consuming problem of having them made.

Exclusive custom work thus has increased in the past 10 years, and the enormous sale of ready-to-wear dresses, waists, and suits has greatly increased alteration work. Since the smaller establishments have been, to a great extent, training schools for the so-called apprentices, their passing is of considerable importance to the trade as a whole.

Apprenticeship training in the dressmaking trade practically no longer exists, due partly to pressure of competition and partly to the expense of wages during the period when the learner gives little or no return. The demand for experienced finishers, skilled fitters, and drapers, therefore, far exceeds the supply. Learners who know nothing about sewing are employed only as a last resort, and dressmakers report that not more than one in six to eight shows sufficient ability to justify the time and money required for training.

Another factor which affects the employer's attitude toward apprentice training without indenture is that it does not really lessen her problems. The demand for workers is such that a second season the partly trained workers may find better wages in another shop or in alteration workrooms, and she is again short of help.

The women employed in custom dressmaking came into it in various ways. Some were errand girls, stock keepers, and shoppers who gradually gained a knowledge of fabrics, colors, and styles. As time permitted, they picked up sufficient knowledge of sewing and the putting together of parts to enable them to become finishers or lining makers, and so fell in line for promotion to other work.

Many women in the dressmaking trade have learned hand sewing and machine sewing, and to some extent dressmaking, in their homes. These are considered very desirable employees. They are, in many instances, the real students of the trade, and frequently develop the artistic ability which is so large a factor in success. Others have had experience in the small shops, but these shops may no longer be depended upon as training places. The uncertainty of obtaining positions under present conditions still further emphasizes the view that experience and training are necessary for workers who wish to enter the sewing trades.

The women employed in the alteration departments in stores have been home dressmakers and assistants in establishments. Occasionally a woman who has been in factory work is employed. As

this work has less to do with style than the custom trade, few drapers and designers are employed. Finishers for hand sewing and machine sewing constitute the greater proportion of the workers.

Promotion from one position to another of higher rank or rate of wage is provided for in some establishments, but, owing to the fact that there is no system of apprenticeship or training, it is incidental and perhaps too infrequent. The majority of workers secure it by shifting from one establishment to another so as to vary experience and learn new methods. In this way a number of workers have acquired experience and training which have placed them in the foremost ranks. However, this method is difficult and uncertain. It consumes too much time and energy and may be used with any degree of certainty only by those, with few exceptions, who are not dependent upon their earnings or have unusual courage and foresight.

The line of promotion from lining maker to waist or skirt maker or draper is well defined. The difficulty lies below the position of lining maker and above that of draper. In the lower positions promotion is almost wholly a matter of training; in the higher it is first a matter of artistic talent and second a matter of the development of this talent through experience and training.

Hours of work in dressmaking establishments are the same as in factories—54 a week and not more than 9 in any one day.¹ Dress-making and altering in stores conform to the regular store hours, which are from 51 to 52 a week. Employment is practically constant for most workers in the trade, though there is a short lull at Christmas and a longer vacation in August. The seasonal fluctuation is felt most keenly in the great pressure which comes at the beginning of the fall season, in January in preparation for the southern season, and in March and April in preparation for the Easter and spring seasons. At these times the rush is very great and extra workers are employed when they can be had. For the rest of the year, with the exceptions noted, the work keeps the dressmakers and employees busy but not rushed.

The great majority of employees are women. Tailors and tailors' helpers are men, and there are a few men designers.

There is no physical strain or danger to the health if proper work-room conditions are provided. Remaining in one position, as for hand sewing, may be fatiguing, but the work, as a rule, is sufficiently varied to minimize this. Right habits of sitting and standing go far to counteract any tendencies to overfatigue, stooped shoulders, or narrow chest. Persons having a tendency toward anemia, narrow chest, or defective vision not readily improved by glasses, should not be encouraged to enter the trade.

¹ Unless to provide a shorter day, etc. General Laws of Minnesota, 1913, chapter 581.

The majority of the custom workrooms in the city are good. Many are unusually good as compared with those in other cities.

Qualifications of workers vary according to (1) ability and skill in performing the mechanical part of the work, and (2) artistic ability, as in planning and arranging trimmings and designing garments. The person who can plan artistic gowns may not be at all successful in the sewing, and she who excels in handwork on chiffon, silk, or other fine material may have no talent for artistic trimmings or designs. On the whole, however, the designer has a working knowledge and frequently skill in the mechanical part of dressmaking.

Ability to sew neatly and to handle skillfully fine fabrics is essential. Much attention has been given to the kinds of stitches, seams, and hems to be used. This is important, but of more importance is the ability to handle fabrics so as to keep the grain running in the right direction. This requires knowledge of fabrics, good judgment, good eyesight—the grain being determined by the warp or woof threads—and a fine sense of touch. A tendency to moist hands which can not be corrected will disqualify even a skillful worker, as the moisture is likely to spoil delicate fabrics.

Ability to measure accurately is necessary. Measurements may be made with the tape measure, by matching the two sides of the garment, or merely by judging the length or size. The last named is called eye measurement, and is very important. It comes from long and careful practice in the use of the tape measure. Many workers do only hand sewing, but the greater number do machine sewing as well, and are expected to know how to handle the various fabrics in both types of sewing.

The essential educational qualifications are practically the same for all occupations, though artistic qualifications may vary. One should know the fundamental processes of arithmetic, decimal fractions, and simple percentage; speak and write clearly; be able to spell words in common use and the names of materials used in the trade; and understand bills, receipts, checks, and money orders, and how to indorse the two last named.

Many women in the trade have not this education, but they do not encourage young people to enter the work without it. Dressmakers who have given consideration to the question hold that less than an elementary education is not sufficient, and that secondary education is, to some extent, desirable. Several dressmakers, when asked how much education a girl should have, said in substance: "As much as they can get. The girl who lacks education can not get ahead." Only one was indifferent. Her reply was, "I don't care anything about her education so long as she can sew." Several expressed themselves as much in favor of vocational training in sewing and dress-making and of such instruction in art as might be correlated thereto.

Ability to take directions readily and carry them out accurately, initiative, alertness, promptness, and willingness are among the qualities necessary if a worker is to rise to the higher occupations. Power to observe and to visualize, a quality which helps to develop artistic ability, is necessary for success. All workers should have a knowledge of colors, and good taste in the arrangement of colors, trimmings, and lines. Creative ability, as in the planning of gowns to suit individuals, is a high order of art which relatively few persons acquire.

Workers are not selected for the trade in the sense that their fitness or their ability to develop skill and artistic ability is seriously considered. Dressmakers choose from the applicants those who can sew and those who have had experience in dressmaking shops. Experienced workers are retained year after year, but no serious or united effort to train workers is made. This is due in a measure to the press of competition and to the fact that dressmakers have as yet no business organization in which they may cooperate to solve the problems of their trade.

Wages paid to workers in this trade are difficult to determine. There seem to be no standards even in shops commercially in the same rank. As nearly as can be ascertained without searching inquiry, rates range as follows: Helpers, \$2 to \$6 a week, a few receiving possibly \$8; shoppers, \$6 to \$10; finishers, \$6 to \$10; lining makers, \$8 to \$10; waist drapers and skirt drapers, \$8 to \$15; fitters, \$10 to \$18, a few skilled fitters receiving \$20 to \$25 or more. Most of those receiving the higher wages in each department or section are skillful workers who have ability to direct a number of assistants. The wage rate is determined largely by the number of assistants and by the amount of work director and assistants can turn out.

As in all other lines of employment, wages vary according to the skill required and the available supply of workers. Thus an over-supply of skirt makers may decrease their wage rates, while an under-supply raises the rates.

Custom dressmaking represents the craft of the trade. It retains practically all the skilled needle arts and within recent years has made great advance in the use of machine hemstitching, braiding, and embroidery. Designing has become a great art of which the successful dressmaker must have considerable knowledge. Like the milliner she must be able to reproduce models seen in the fashion centers and must have creative ability in adapting dresses to design, arranging trimmings, and combining colors. This applies more or less to every worker in any way responsible for the appearance of the dress.

Alteration work is not, strictly speaking, a branch of the dressmaking trade, but since it is done according to the dressmaker's method, and the workers are recruited largely from dressmaking establishments, it was studied in connection therewith. The work is limited for the most part to the more mechanical processes of readjusting belts, refitting and hemming skirts, and refitting sleeves and waists.

OCCUPATIONS IN THE DRESSMAKING TRADE.

The organization of the workrooms varies in the different types of shops. The dressmaker who conducts a large business frequently has a designing, a sewing or making, and a tailoring department. Although each of these has its work arranged as a unit, they must of necessity work in cooperation. The smaller establishment rarely has more than a single workroom, where the designing, such as there is, is done as the work progresses. In all shops where helpers are employed, the sewing or making department is divided into two or three divisions or sections, for waists, skirts, and, when they are included, coats. In each of these the work is again divided. In the waist section there are lining makers, drapers, fitters, trimmers, sleeve makers, and finishers. In the skirt section there are lining makers, drapers, fitters, and finishers. In the coat section there are the tailor, one or two men apprentices who assist him, and hand finishers, who make buttonholes, put in linings, and do any fine hand-work there may be.

The helpers are the younger workers who sew on hooks and eyes and help with other less important work. If they sew very neatly they are allowed to assist in the important parts of finishing. They may do fine hemming or run tucks. Such girls have had no training in dressmaking, as a rule, but have been taught sewing in school or at home. They are the learners in the trade, and observant girls may pick up considerable knowledge. The number employed is very small, as dressmakers say they can not afford to give time to training learners for the more important work.

Many girls who enter establishments as helpers become finishers, and, if good hand sewers, remain in that position. Occasionally talent for draping or fitting is recognized and the worker is pushed ahead, but training for such promotion is not to any extent regularly provided for.

The shopper makes the incidental purchases for the establishment. She matches fabrics with threads, linings, and trimmings. She is frequently called upon to buy material to match a sample; this requires ability to match color, weave, and texture. She must use her judgment in selecting linings or velvet that do not exactly match a sample of cloth. She must be able to take directions and carry

them out accurately. She must know where articles may be found and must be able to quote prices. She must be observant so as to report on new articles in the stores that may be useful in dress-making.

Shopping is considered good beginning work for a young person. It requires memory, ability to match colors and fabrics, power to observe, alertness, and good judgment. It is an excellent opportunity to learn costs, amounts of materials needed, and business methods. A girl looking forward to doing business on her own account may get valuable experience and training. A pleasant but dignified manner, good taste, and quiet but attractive dress are important points to be observed.

The waist-lining maker prepares linings for the draper and fitter. She cuts the waist lining to measure, bastes the parts together with seams of equal depth, making both sides of the garment alike, fits it over a dress form, and sews on the hooks and eyes, or, in the larger establishments, gives that work to an assistant. She bastes in place the interlining if one is used, and she cuts, bones, and sews hooks and eyes upon the belt or fitted girdle. She makes any alterations necessary after the first fitting, and bastes lining to belt ready for the draper.

She must know how to make linings of silk, batiste, net, and chiffon; how the grain of the material must run to make the lining fit the figure well; and the different methods for boning waists and girdles. She should have a knowledge of slender and stout, long-waisted and short-waisted figures, and those having other irregularities. She must know that holding and sewing a seam on one side of the garment in one way and not reversing the work exactly will throw the waist out of shape, and that hooks and eyes not carefully matched may interfere seriously with its appearance. A skillful worker makes linings that are accurate to the fraction of an inch, and so fresh and clean that they look as if they had not been handled.

Although one of the minor occupations, this work requires considerable knowledge of garment making, ability to sew neatly, and accuracy in measurement and in making seams.

The waist draper arranges the fabric on the fitted lining. She puts the lining on the dress form padded to suit the size of the customer, and arranges the cloth on fronts and back according to the model or the directions of the designer. To do this successfully she must know how to use the grain of the cloth to get the desired result; how to work in the cloth at the seams to make the garment fit the body; where to allow fullness and how the grain should run so as to make fullness effective; and how to keep both sides alike, or make them appear alike, unless a difference is desired. The draper may use one

material or combine several kinds. She directs the placing of gathers, tucks, or sewing that may be done while the draping is in progress, and directs the sewing of the seams when it is completed.

A knowledge of fabrics is essential. It is required quite as much for the waist of plain material and simple design—which frequently calls for the highest degree of skill—as elaborate effects. Garments are, to a great extent, good or bad, according to the skill with which the grain of the cloth has been used to produce graceful lines. The skillful dressmaker considers trimming much less needful to the beauty of a garment than the careful use of material in effecting lines in the garment itself.

Good judgment, good eyesight, an accurate sense of line, proportion and space, and good taste are essential. Neatness in handling fabrics is necessary. In many establishments the designer is the draper. Designing is open to drapers showing talent therefor and neatness in handling the fabrics. Practically all drapers and designers have served as lining makers.

The waist fitter does all the fitting on linings and waists of dresses as well as separate waists. She takes the measurements which she and the lining maker use. She inspects the garment as it comes from the draper, puts it on the customer and fits it to suit her figure. She must know the effects of lifting or shifting seams, altering fullness, and making other adjustments. She must know how much fullness to allow in the outer part of the garment, when to use straight and when cross lines, and how to work in the cloth in the fitting so as to suit the garment to the figure of the wearer.

As even slight changes have great effect on the appearance of the garment, the work is exacting. It calls for knowledge of fabrics, of the figure, of individual variations and characteristics in persons. It requires some knowledge of designing, as the fitter carries out the plans of the designer. In many of the smaller establishments the fitter and draper design the waist, so must have a knowledge of color and color harmony, combinations of materials, and arrangement of trimmings.

Accuracy in measurement and good taste are important qualifications. The fitter must understand making linings as well as constructing the outer part of the garment, as she frequently directs both lining maker and draper. Waist making is a trade and many workers remain waist makers. Others who wish to become dressmakers may learn to drape, fit, and make skirts.

The sleeve maker designs and makes the sleeves for all waists and gowns. This work is so important that all larger establishments have one or more sleeve makers and employ helpers for them. The sleeve must be designed to correspond to the style of the dress. This design may be in the pattern used; in the combination of materials;

in the use of tucks, gathers, or crosslines; in the way the grain of the cloth is used; in accessories such as cuffs or undersleeves. It may be a combination of several of these, and the successful sleeve maker must know them all and be able to use them in a variety of ways.

The sleeve maker should have much the same sort of knowledge of fabrics, color, the figure, and good style as the waist draper. As a rule, sleeve makers are waist makers who showed ability in designing and making sleeves and so became specialists.

The dressmaker is the designer and business head of the establishment. As an artist in her trade she knows the fashion centers; styles and how to use them to suit different types of persons; fabrics and how to use them to obtain artistic effects; various types of figures and the lines in garments and trimmings that best suit them; how to make dress minimize or accentuate personal characteristics so as to get effective results. Her highest art is displayed when she can make the dress express the individuality of the wearer.

As a dressmaker skilled in sewing and garment construction she knows the methods and processes of putting together fabrics of all kinds.

As supervisor of her workrooms she knows her trade, knows how to plan and direct the work of a number of persons, and has the ability to manage people.

If she owns and manages her establishment, her art in producing gowns becomes a part of the selling of them. She interests her customer, makes suggestions, and assists her to make a decision in much the same manner as the sales person in the store.

As the business manager she knows the markets, both exclusive and jobbers'; prices and values; the available supply of workers; the range of wages to be paid; what prices to ask for the product of her establishment; and methods of accounting, banking, and carrying on the business, which she may do herself or delegate to an assistant.

In some establishments the so-called dressmaker is the business manager, who employs a skilled dressmaker-designer to carry on the manufacturing of the garments. When this method is used, the designer must have the knowledge detailed in the preceding paragraphs with the exception of financial management.

Alteration of ready-to-wear garments is confined largely to fitting and finishing. The fitter adjusts the garment to suit the wearer and usually does any redraping necessary. She decides what alterations are to be made; directs the ripping, basting, and preparation for the second fitting which is frequently given; marks the garment for further alteration, if necessary; and directs the work of finishing. Fitters in these workrooms may fit dresses and waists, or coats and suits, or both types of garments.

The finishers are divided into two groups, hand and machine. Hand finishers do such work as basting, sewing on hooks and eyes or snappers, hand hemming, tacking, and binding. Machine finishers do seaming, machine binding, and putting in rows of finishing stitching, as on the edge of coats or the tops of seams. Alteration workrooms are using both dressmaking and factory methods on ready-to-wear garments. Electric-power sewing machines are replacing those run by foot power. The fitter's, draper's, and designer's arts are being used to make ready-to-wear garments of silk, chiffon, net, broadcloth, and the like, fit well and appear artistic, and touches of embroidery and other hand sewing are used to give the work the appearance of custom-made garments.

The skirt-lining maker cuts and makes the drop skirts in use at the time of this survey. She cuts the lining to measurements taken by the fitter; bastes the parts together with seams of equal depth and so as to make both sides of the garment alike; makes the placket; adjusts the skirt to measurements on the figure, and makes the belt. The garment is then ready for fitting. When it has been fitted and the length determined, she makes any alterations necessary, sews the seams and turns the hem ready for the finishers, who finish the bottom and seams. She also presses the lining and sews on, or directs the work of sewing on, the fasteners.

The maker of skirt linings must cut the cloth with the grain running in the right direction; must use cloth to the best advantage; and must make allowance in length to allow for fitting and finishing. In making alterations she must know how to make the two sides of the skirt alike, or appear alike on the figure.

She must be able to read and to follow measurements accurately, to handle taffetas, messalines, nets, and batistes, and to place the seams in the lining to make the garment fit well and to suit the outer part of the dress. She is, in a sense, the assistant to the skirt maker, whom she may help in making the outer skirt. Thus she may learn to be a skirt draper if she is observant and shows talent, and eventually may be promoted to that position.

Dressmaking establishments that are succeeding in spite of competition are those that combine with the old handicraft methods the processes of the modern factory. This is done by the use of up-to-date machines and, to some extent, a corresponding division of work between skilled and inexperienced workers.

A number of dressmakers use the modern power hemstitching machines for trimming and finishing. Braiding, embroidery, and cording machines also are found. These replace handwork acceptably and reduce the cost of labor materially. Operating these machines on the various fabrics used requires a high degree of skill. The art involved is changed in kind rather than degree, since the

operations depend upon the accuracy of the operative and his skill in finish, and the machine in no way controls the combination of colors or the design. Some dressmakers compromise by sending this work out to a shop which specializes in these lines.

Although the work is divided among a number of persons, the specialization is desirable—except in cases where the employer insists upon keeping a worker indefinitely at one process—as it gives opportunity for the development of many grades of skill and ability. If it were not for this method, there would be practically no opportunity for the draper and designer to develop the skill and the talent which has brought dressmaking to its present standard of technical efficiency and artistic expression.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

There are at present two general types of dressmaking: (1) Custom dressmaking and (2) alteration work on ready-to-wear clothing. The custom dressmaking is more specialized than the ready-to-wear work. It has three rather distinct divisions or phases: (1) Fashionable dressmaking; (2) making of children's and infants' wear; and (3) semitailored dresses and shirt waists. Custom dressmaking calls for a higher order of workmanship and taste than alteration work, and, therefore, for more artistic and creative ability; consequently, it furnishes the largest demand for the trained dressmaker having these qualities.

The small dressmaking establishment with one or two employees is passing out of existence. This is probably true also of the house-to-house seamstress. The tendency of the trade seems to be that of centering ready-to-wear garments in the department and specialty stores, and of the custom dressmaking in large dressmaking establishments where a division of labor and specialization of tasks is going on similar to that in practically all the other trades studied by the survey.

Apprenticeship training for the dressmaking trade, if it ever did exist in Minneapolis to any extent, has practically disappeared. The trade recognizes that if competent dressmakers and dressmakers' assistants are to be trained in the future the services of the school will be required.

The present source of supply for new workers in the dressmaking business are, on the one hand, women who have learned hand sewing and machine sewing, and, to some extent, dressmaking as well, in their own homes; and, on the other hand, a shifting crowd of dressmakers, good, bad, and indifferent, who shift from shop to shop, gaining some new asset of skill or knowledge from each, but who constitute an

uncertain and, on the whole, a somewhat undesirable group from the standpoint of permanent employment and service to the trade. The experience which these workers gain by shifting from shop to shop is not systematically organized, and, as in the case of the workers in so many other lines, is too much dependent upon chance to furnish adequate preparation in any but unusual cases.

Two general groups of workers are found in both the custom dress-making and ready-to-wear alteration work—those having ability for and skill in performing the mechanical part of the work and those having artistic ability in planning and arranging trimmings, and designing dresses, waists, and gowns. While both mechanics and artists are needed for custom and alteration work, the custom work furnishes the largest demand for those with artistic ability, because more taste and creative effort are required. Any scheme of training for dressmaking work should recognize this difference in kind of workers. While all need a basic training in the mechanics of sewing and garment construction, at the same time a distinction should be made in the course between those who give promise of artistic ability and those destined for mechanical work alone, so that proper training may be given to each.

Dressmakers who have given any thought to the question believe that less than a full elementary school education is not sufficient for workers in the trade, and that secondary education is, to some extent at least, desirable.

Training in sewing and garment making opens up a number of avenues of employment to girls in spite of specialization. Probably no other one type of training opens up so many avenues of employment. Though dressmaking is mentioned in an inclusive way as being one trade, it is in reality many trades, just as the term "metal trades" includes the machinist trade, the tool-making trade, and various other distinct trades.

In addition to the high-grade custom-dressmaking trade, which makes fashionable gowns for all occasions, there are other trades in dressmaking that are recognized in the business world as separate trades. It is true that the ultra-fashionable gown represents the highest art and the greatest skill in the dressmaking trades, but other lines of dressmaking are rapidly being recognized as having distinct places of their own.

The making of shirt waists is a trade. The making of infants' and children's clothing is a trade. The making of semitailored dresses of linen, cotton, wool, and silk fabrics is a trade. The alteration of ready-to-wear dresses is fast becoming a trade. Remodeling and repairing worn clothing is, to a limited extent, a trade. Seamstress work of the sort that enables a worker to do such all-round sewing and dressmaking as may be done in the home of customers is a trade.

The mother's helper who can assist in the household mending and sewing is another possibility for the girl who can sew.

Not all types of sewing and dressmaking call for the same kind of training. Elementary courses for the teaching of stitches, seams, hems, facings, and the construction of plain garments may be the same for all pupils. The basis of specialization, after fundamental courses have been given, will be determined in most cases by two factors: (1) Artistic talent and (2) ability to handle fabrics of different kinds and textures. These two abilities may find expression in different ways. A girl may show a talent in designing simple tailor-made gowns or in designing the more elaborate dresses of soft or sheer materials. In any case it will be greatly to her advantage to learn designing early in her career. Through this she may be able to build up a trade in the making of nurses' and waitresses' uniforms. On the other hand, if she succeeds best in the soft, sheer materials, she may develop both artistic ability and mechanical skill in the ultra-fashionable type of dressmaking. Children's clothing calls for still another type of ability and training. The making of simple tailor-made clothes for children has become a recognized trade, for which special artistic ability, combined with a knowledge of the hygiene of dress and its relation to health, is demanded. This type of dressmaking is of sufficient importance in a city like Minneapolis to be worthy of the consideration of young women who are preparing for the sewing trades.

Therefore, to prepare better for entrance to the trade, it would be desirable to provide in the public vocational schools such courses as the following:

A. Daywork.

I. Elementary hand and machine work; principles and application.

II. Regular shopwork. (Distinguish the mechanical workers from the artistic and train accordingly.)

First.—Hand and machine for new principles and repetition of old on orders in undergarments, children's clothing, kimonos, and so forth.

Second.—Rapid machine work on ready-to-wear clothing, such as uniforms, gymnasium suits, simple gowns of varied materials, and the like.

Third.—White work; infants' and children's clothing; lingerie requiring fine sewing and neat machine work.

Fourth.—Elementary dressmaking and children's tailored clothing.

Fifth.—Higher class dressmaking. (Room subdivided as in trade according to various parts of garments.)

Sixth.—Alteration and seamstress work.

B. Nightwork.

Brief courses; designing on cloth, costume modeling, fitting, draping, drafting, and the like. Two groups—mechanical and artistic workers. Some sleeve, waist, and skirt work would be needed. Probably alteration work could be added.

As the result of the work of the survey, a trade understanding for the dressmaking work at the Girls' Vocational High School was made with the leading dressmakers of the city. No arrangement was made with employees, as the trade is not organized. A full description of this trade understanding will be found in Chapter XXIII on "Cooperation between the schools and the trades." It is enough to point out here that the trade is to aid the school in standardizing its work and to employ the girls who have finished the two-year course in dressmaking as the preferred source of supply in taking on new workers.

As a further result of the work of the survey, courses of study for the dressmaking trade were worked out in conference with the trade, and are now being put into effect in the Girls' Vocational High School.

MILLINERY.

Minneapolis is one of the most important centers in the Northwest for the millinery trade, particularly the better grade of goods, as it is the distributing center for four States. The United States Census reported for 1910 a total of 914 persons employed as milliners, 884 of whom were women. This does not include saleswomen in stores, of whom there were about 221, making a total of 1,135 persons in the business in 1910. From 1910 to 1914 the estimated increase of population was 13.9 per cent. If one assume the same rate of increase for the millinery business there are now about 1,300 persons engaged therein. There are 128 establishments, 121 of which are retail shops, including the millinery departments in stores, 5 are wholesale establishments dealing in hats, and 2 are wholesale trimming houses. Parlor milliners are not included.

The millinery shop of a decade or more ago was a factory. Practically all hats and many trimmings were made by hand. The shop of to-day is a display and sales room. The hand-made hat and hand-made trimming, except for a small part of the business, have given place to the machine-made hat and factory-made trimming. The retail milliner sells five so-called tailor-made hats, largely factory made, to one made entirely by hand. Owing to the increased popularity of the tailor-made hat, retail milliners employ fewer preparers, makers, and trimmers than formerly in proportion to the business done. Wholesale and factory millinery has increased proportionately.

A few differences between the large and small retail shops should be pointed out. Exclusive shops, or those dealing only in trimmed hats

and millinery novelties, show little variation in division of labor and methods of work. The shop catering to an ultrafashionable clientele employs a trained designer and handles expensive and exclusive material, whereas the less fashionable shop rarely employs a designer and deals with a cheaper grade of merchandise. In a city as large as Minneapolis there is undoubtedly room for both types, and the exclusive shop will probably continue, as there will always be a class of trade that prefers the service which these shops give.

The millinery department of the department store has increased its business more than has the separate shop. Women are used to the department store and find it convenient to shop there. The large variety of popular-priced hats is an inducement, and stock well supplied with hats both in and out of season always offers attraction.

Millinery is almost exclusively a woman's trade. Men are employed in wholesale houses as salesmen and occasionally a man is manager or buyer in the retail business, but they are seldom in the workroom or selling on the floor. This is probably because seasons are short and financial inducements not great. Women are strongly attracted to the trade because it appeals to their artistic sense and the attractive surroundings appear to give to the work social distinction. The short season appeals to women who prefer to work only part of the year. On the other hand, the short season is a great hardship to talented women who prefer millinery to any other line of work but must have steady employment.

There is no physical strain or danger to the health peculiar to the industry. There may be eye strain from improper and insufficient light, especially when dark-colored materials are handled. The back strain and fatigue reported by a number of persons interviewed are largely due to the height of tables and chairs, the latter almost invariably being too high. Conditions as to light, space, and ventilation are, on the whole, good. The legal working period for women in mercantile establishments is a maximum of 10 hours a day, or 58 a week. In some shops it is much shorter, and in all it varies greatly.

Millinery is more subject to seasonal fluctuation than most industries, though between-season and outing hats help to carry the trade along. The seasons are confined approximately to three months in the spring and three in the fall. The department stores and some of the smaller shops employ millinery workers as sales persons, but this gives all-year employment to not more than one out of every three, which means a long period of unemployment for many. Though the requirements of the wholesale trade are practically those of the retail the seasons do not alternate definitely enough to allow any considerable number of workers to find employment in both.

Certain personal and artistic qualifications are essential to success. A flexible point of view with regard to methods of work and chang-

ing standards of fashion is especially important, since the trade so largely depends upon style. The power to observe and visualize is probably equally important, since much creative power is the result of ability to use details with originality. Adaptability is largely a matter of temperament, but the power to observe and visualize, though somewhat innate, may be developed by experience and training.

The essential educational qualifications in all occupations in the trade are: Knowledge of arithmetic through fractions and simple percentage, sufficient English to speak and write clearly, ability to spell words in common use and names of materials used, and knowledge of business forms. The difference in the requirements in the various occupations is the degree to which this knowledge is applied and the readiness with which it is used.

The demand for young untrained workers is not great. Girls having no preparation are taken as apprentices during the busy period, and if they show skill with the needle and talent for the work are perhaps reemployed the next season. Many act as errand girls, however, and are given little opportunity to discover their talent or improve their skill. Personal neatness, attractiveness in dress and manner, initiative and alertness are important qualifications. A few employers say they find these in the high school girl, but usually education is not taken into account in employing girls for the workroom.

Trained workers with real skill and artistic talent are always in demand. These may have been trained in the workroom and promoted to higher positions as talent and ability justified, but their promotion is preeminently dependent on the personal and artistic qualifications described.

It is the custom to send promising workers so promoted to trade and fashion centers to supplement their training and experience. Another common method of recruiting workers is to employ trimmers and designers who have had experience in other cities, and this is one way in which workers may secure promotion.

The millinery business is carried on in two departments, the work and sales departments. In shops which make hats to order it is necessary for the two forces to cooperate closely in order to meet the demands of trade. The workroom employs, broadly speaking, apprentices, makers, trimmers and designers, and the salesroom, millinery saleswomen.

The apprentice is the untried worker who is taken in to help during the busy season. For the first few days she is required only to watch an experienced worker. To test her ability to sew and to handle materials she is then given some simple work, such as making a lining or sewing on pieces of silk, chiffon, and velvet. If she shows interest and ability, she is given more difficult work, such as putting

in linings, wiring frames, and making bandeaus. Thus she learns the millinery stitches, how to measure wires, how to use pliers in cutting and bending, and how to lap and tie wires.

The very apt apprentice during her first season may learn to alter and make frames under direction and to assist in covering hats, particularly the crown. During her second season she is expected to complete her knowledge of frame making and covering, including acceptable work on edge finishing, which requires blind and back stitching. She is also given such work as cutting bias strips to measure, fine hemming on velvet, silk, or chiffon, making ornaments for trimming, and pressing in renovating. Six months, representing two seasons, is required to complete this preliminary training.

Apprentices are young girls, usually from 16 to 20 years old. Frequently they receive no wage the first season, their work being considered payment for their training; sometimes they are given \$1 to \$1.50 a week for car fare and lunches. From 50 cents to \$1 more is paid during the second season if their value warrants it. Exclusive shops have from two to four apprentices a year, but the department stores do not like to take them, as too much time is required to teach them and materials are spoiled.

The maker makes frames of wire, buckram, willow, and rice net, remodels and alters ready-made frames of all kinds, and prepares them for covering. She is the skilled mechanic who plans the cutting of all materials used. To do this, she must know the use of the grain of the cloth and the right way to use materials having a nap and those having a figure or design. She must know how to cut materials economically, and be able to cover all types of hats and to finish the edges with equal skill in all of the several ways, which often requires learning new methods each season. She prepares such trimmings as folds, rosettes, and buckles, and renovates hats and trimmings. In addition, she directs and inspects the work of apprentices in her charge.

Accuracy in measurement and uniform neatness in handling fabrics and in workmanship are essential. Although expected to follow the plan of the designer, the maker may be called upon to use her own ingenuity and judgment in making a hat.

An apprentice may become a maker in two seasons, but it requires twice that to acquire the skill of a full-fledged maker. These workers are the largest group in the trade, there being from two to four makers to each trimmer or designer during the busy season. There are approximately 500 in Minneapolis. They are paid \$5 to \$15 a week, and are employed at least 26 weeks in the year. A maker of unusual ability sometimes is employed the year round.

The trimmer may be an order trimmer or a copyist. She plans and trims hats for special orders. For this she may carry out details

furnished by the saleswomen, or, with the customer's preference in mind and some directions to guide her, she may plan the hat. She copies pattern hats, following the model exactly or adapting it to others. The trimmer's art is her ability to choose and combine colors and materials and arrange them so as to meet individual characteristics and tastes and still conform to fashion. Her skill is in her ability to sew trimmings in place in such a way as to preserve the style of the hat. She is valued according to her ability and originality in adapting the features of a good model to the requirements of her own trade.

There is little pure trade technique which the trimmer can be taught, although ability to make a hat throughout is considered necessary. As a rule the trimmer has served two or more seasons as a maker. She has a thorough knowledge of all types of fabrics and trimmings and knows how to handle them so as to get the best effects. This knowledge is best acquired in the workroom. A knowledge of color harmony, line and proportion, as related to headdress, whether learned by handling many hats and dealing with many customers or through instruction in the principles of art, is the largest factor in her training.

There are approximately 100 trimmers in Minneapolis. Wages are \$15 to \$40 a week for 26 working weeks. The trimmer in small shops may assist in selling and thus prolong the season.

The designer is the creative artist of the trade, but this term is often a misnomer, since most so-called designers are merely clever copyists. America is said to have practically no real designers, but considerable interest is being shown in the development of a national school of art in dress. The designer goes to New York or European openings, which precede the retail openings by several weeks, studies the season's fashions, copies pattern hats, and selects merchandise for the season. She studies dresses, suits, and coats also, for she must make hats to be worn with all types of clothing.

When she returns to her shop, she plans the making of hats for her local trade, adapting the season's style to the taste and means of her patrons. In exclusive shops where the same customers come year after year she anticipates their desires as far as possible. She is responsible for the work of her makers and trimmers and, as a rule, directs the work on all hats. In the small establishments she may at times do some of the making and trimming, for she is skilled in all the work of the shop.

It is practically impossible for a woman to hold the position of designer unless she has the personal and artistic qualifications specified. If she reaches a point when she no longer takes new ideas readily and her methods become so rigid as to stamp her product with sameness, her value as a designer is gone. A woman may keep

this freshness of viewpoint for many years or she may lose it after a few years in trade. The demand for designers has increased greatly in recent years, and practically every shop must employ at least one person having talent in this direction. Although the designer does not necessarily meet the trade, she must have some of the qualifications of the saleswoman, as her product must please the customers that come to the store.

It is difficult to estimate the number of designers, as many are really copyists and trimmers. Wages are \$25 to \$50 a week. Designers are employed 30 to 40 weeks in the year.

The millinery saleswoman is, as a rule, a trained milliner. In the larger establishments she devotes all her time to waiting on customers, but in the small shops she trims as well as sells the hats. She studies such personal characteristics as size, build, features, and color of eyes and hair, and the shapes of hats, colors, and styles of trimmings suited to the various types. The skill of a saleswoman lies in her ability to recognize type readily, to choose models suited to individual requirements, and to try them on her customers in such a way as to display their best points. She must be able to suggest styles of hats, suitable colors and trimmings, and frequently must take orders for hats to be made up.

Good appearance and attention to prevailing fashions in dress are necessary, these points contributing materially to the satisfactory display of hats. Owing to the increase in factory-made hats of all kinds, the popularity of the tailor-made hat and the tendency to buy several hats each season, there is a greater demand proportionately for saleswomen than for makers and trimmers.

There are estimated to be at least 300 millinery saleswomen in Minneapolis. In the large establishments employment is practically constant for a large number of workers, but some are employed for the season only. Wages are from \$5 to \$25 a week.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

1. A trade understanding was reached with the employing milliners of the city as the result of various conferences held by the survey. This was similar to those arranged for the other trades taught in the Girls' Vocational High School. A three months' probationary period in the schools is to determine the pupils' interest and fitness for the millinery work. After two years of training in the schools, the girls of the class in millinery are to be placed in the millinery shops of the city at a beginning wage of not less than \$8 a week. The diploma of the school is to be withheld until proof of satisfactory work in the trade is furnished at the close of one year. An advisory committee of employers and employees is to aid the school authori-

ties in standardizing the work of the school. Whenever the conditions seem practicable, part-time classes are to be formed for girls already employed in the business. In Appendix C a more detailed description of these trade agreements is given.

2. In planning preparatory courses and trade extension courses for millinery, the survey committee believe that the following points should be kept in mind:

1. The seasonal character of the milliner's trade, offering for the ordinary worker only about six months' employment, is of first importance. While it is not yet clear for what other lines of employment girls taking the millinery course should also be prepared in order that they may have an opportunity for continuous work, the problem is one toward which the school authorities must be constantly awake. Girls who need continuous employment should, under the present circumstances, be fully informed as to the seasonal character of the trade before they enter it or take preparation for it. It would seem that the largest opportunity for the school would be to fit girls for rapid advancement into the salesmanship side of the business, where practically continuous employment can be had by girls with ability.

2. Since rather definite artistic ability and personal qualifications are necessary for the greater proportion of millinery workers, the course should deal with a carefully selected group.

3. During the probationary period the work should be planned to test artistic appreciation and creative ability in order to discover pupils showing promise as trimmers or designers.

4. Pupils giving promise only of mechanical skill in making hats and preparing trimmings should constitute the smaller proportion of the group.

5. Mechanical workers should be interested in and trained for factory and wholesale trades in which there is a demand for greater speed and skill.

6. Training in salesmanship might well be given in connection with the course in millinery, as many of the workers are called upon to sell hats.

7. Art courses correlated with millinery should provide for sketching from models seen in shop windows, designing hats for various types of dresses and suits; and teachers of both subjects should cooperate in giving pupils opportunity to design and drape in fabrics and trimmings.

A course of study in millinery was drawn up in conferences by the survey and has been approved by the trade. This course not only covers the things which the pupils of the Girls' Vocational High School should, in the opinion of the trade, be taught, but offers a series of short-unit courses which the evening public school classes might give to those already in the trade.

CHAPTER XVI.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR THE KNITTING MILL?

Knitting is one of the largest factory industries in Minneapolis. The United State Census for 1910 reports 1,926 women and 150 men employed, more than 60 per cent of whom were in one mill, the largest of its kind in the world. Since 1910 the industry has grown materially, especially in two of the larger factories, and one additional small factory has been established. The greater part of the product is knitted underwear, though sweaters and hosiery are made.

The demand for workers in all departments of the underwear industry has increased greatly in the past five years, and the demand for experienced workers is greater than available statistics show.

Hours of work in the knitting industry, as in all factory industries, are limited to 54 a week. Work begins at 7.30 a. m. and continues until 6 p. m., with half an hour at noon. By this plan workers have a half holiday on Saturday, when the factory closes at 12 m. No overtime is reported; sometimes work is not enough to keep the employees busy the entire day and they go home as soon as their work is done. These short days affect wages of all pieceworkers and those on an hourly basis, for they are paid only for work turned in or hours spent at work.

The underwear industry is less influenced by seasonal demands than some other branches of the garment industry, though it has slack seasons when not all workers may be employed full time. The busy season for winter underwear is the spring and summer, and for summer underwear the fall and winter. As in other garment industries, employers are trying to distribute work throughout the year so as to eliminate the slack-season period. This has been accomplished to a considerable extent by making a greater variety of goods than formerly.

Most factories close for two weeks in August for the annual vacation. At this time general repairs are made. Inventory or a marked change in the management of a department may demand closing the department for a day or two. Otherwise, employment is fairly steady throughout the year for most of the workers.

Nearly all wages for knitting, cutting, sewing, pressing, examining, and boxing is paid for on the piecework basis. Hence earnings vary according to the skill and speed of the worker. Employees whose

work can not be measured by the piece are paid an hourly rate. Operations which pay much below the average are considered to give insufficient return to the worker in wages and to the industry in work. An effort is made to shift misfits among the workers to departments where there may be a chance to make good.

A system of fines to guard against imperfect work is used in some factories, a predetermined margin being allowed, but the operator who turns out uniformly good work gets only the regular rate. To meet the serious problem of irregular attendance, one firm pays a semimonthly premium of 5 per cent on the earnings of each employee who has lost no time in that period. Time lost because of the closing of the factory is counted against the factory and regular wages are paid employees for time so lost. Increase in wages is gained, therefore, through increased amount of piecework and regular attendance for practically all who work under the piecework system. Hour rates for others increase in about the same proportion as the earnings of pieceworkers advance, and in some cases by promotion to a weekly wage as teacher, forewoman, inspector, or mender.

No organization of manufacturers or employees exists in the knitting industry in Minneapolis; hence there is no means of collective bargaining, though there is some cooperation in setting piecework prices. Employees are taken into some factories under agreement binding them to a six days' notice of intention to leave or forfeiture of wages for that time. This is held to be justified on the ground that skill necessary for the performance of the difficult operations requires a period of learning of from two weeks to two or three months, according to the type of work. For this the industry pays the employee 10 cents an hour, though in most cases she earns much less. Notice of the intention to leave gives the employer time to fill the place; if such notice is not given, the employer gets small return on the investment made in the training.

No regular apprenticeship system is used, though an indefinite period of learning is provided for at a minimum hourly wage of 10 cents, as stated. Learners in the knitting, cutting, sewing, and pressing departments are taught by instructors selected from the most skillful operators, and further assistance is given, if necessary, by the forewoman or operator beside whom the worker is placed. None of the garment factories has a room set apart for training learners. The short period of instruction and trial on piecework is the only method for placing them. Attention is also given the size, health, and alertness of workers chosen.

Native and European born persons constitute a very large proportion of the workers. Many are from the country districts of the State. There are very few girls just out of school or young employees of any kind. Practically all the work requires willingness to work steadily,

a quality young people have not, as a rule, during the school age. In the opinion of some executives, girls under 18, unless strong, active, and alert, are not desirable workers, and boys under 16 are not sufficiently well developed and self-reliant. If this is true, practically all the preparation for skilled operations will eventually be provided before regular employment begins. Young men and women who have accepted the idea of responsibility are given the preference when new workers are engaged.

Minneapolis employers have given much attention to making their factories light, comfortable, and well ventilated. Air-washing systems are used in some mills. The overcrowding found in factories in other large cities is absent here.

In all work where the health might be affected by conditions peculiar to the industry, precautions are taken to guard the workers. In washing and bleaching, and to some extent drying, dampness is unavoidable, though well-drained floors and ventilation to carry off the moisture are provided. Cloth for boiling is placed in kiers by a man, who lays it in folds so that space may be well utilized and water and steam evenly distributed during the process. Men also lay the wet fabric in folds or piles in other parts of the bleaching. Special shoes are provided for these employees. It is essential that men employed here should be in good physical condition.

Women who tend the drying machines are somewhat exposed to dampness, though the fabric is handled almost entirely by machinery. They are exposed to excessive heat when they enter the machines for short intervals to straighten out loops of fabric that have become tangled. Rolls of cloth weighing about 35 pounds are handled by the women in the drying and knitting departments and, although they are moved only short distances, the 70 to 80 rolls a day represent considerable weight. Particles of wool and cotton fiber accumulate to some extent on the operatives in the knitting departments. It is believed that these fibers are too large to be inhaled, and hence are merely unpleasant. The fact that there is less labor "turnover" and a larger proportion of long service in this department tends to verify this.

There is little ground for the statement frequently made that sewing on electric-power machines is necessarily nerve racking or injurious. It seems to be so only in overspeeding, something not found in Minneapolis knitting mills. Opinions among operatives as to the extent the noises "get on their nerves" vary, as far as can be determined without tests, according to temperament.

Some workers are temperamentally nervous and jerky in their movements, and as far as possible these are placed in jobs which affect this tendency less. Some workers stand constantly, some sit con-

stantly, and others sit and stand intermittently. It is impossible to ascertain without tests the length of time a worker should remain without interruption in one position. More and more attention is being given to these problems, and employers are realizing the importance of eliminating any excess of effort which tends to impair the worker's present physical condition or risk her health for the future.

The knitting industry presents no problems materially different from those in other employment involving similar conditions. A better knowledge as to the demands which occupations may make upon them is greatly needed by workers. Right habits of sitting and standing and adherence to simple rules of diet and hygiene would go far to help workers in the knitting mills, as well as others, to keep in good physical condition.

The knitting industry is organized, like other factory industries, with office, advertising and selling, manufacturing, and shipping departments, each with its own organization and method of work. These are centralized under the general direction of the chief executives or members of the firm. The manufacturing is further divided into (1) knitting, which includes spooling the yarns and knitting the fabric; (2) washing, bleaching, and fleecing; (3) cutting; and (4) folding and boxing.

All supervising work is done by men, assisted by foremen or forewomen. Machine adjusters and repairers, truckers, and workers in the bleaching, washing, and fleecing departments are men. Each department is in charge of some one with years of experience in the work which he has in charge and a first-hand knowledge of all its details. These persons are responsible for the work turned out by their departments, and they cooperate with the accounting department by furnishing information needed to check up work. They are paid a weekly or monthly salary.

Machine adjusters and repair men are employed in all departments to adjust and repair the machines, replace small parts, and occasionally rebuild or partially rebuild worn machines. In the knitting and sewing departments exceptional skill is required in adjusting the machines for the various kinds of work.

Good judgment, ability to keep follow-up records of repairs and adjustments, a high degree of mechanical ability, and a knowledge of knitted fabrics are required, as are good health and good eyesight, especially in detecting flaws in cloth and making fine adjustments on the machines. American and foreign born men from 23 to 35 years old occupy these positions. They are trained in the factory as assistants to men in charge, though occasionally one who has been in another plant is taken in. Few, if any, have had technical training, though technical knowledge as well as skill is required for the unlimited number of adjustments and repairs. The rate is 25 cents an hour.

The knitting machines are oiled at regular intervals by the oiler. This man oils the parts as directed by the machine repairer and assists the machine fixer in repairs. He must know something about the structure and action of the machine and where and when oil is needed. The work is not intrusted to him until he has such knowledge, as underoiling wears machinery and overoiling spots the fabric. In a sense the work is an apprenticeship, as the men are expected to qualify as adjusters and repair men. Young men are trained for this work in the factory. Knowledge of machinery is not required of beginners, but men serve as helpers and cleaners until competent to look after the oiling.

Natives and Europeans are employed at this work. The rate of wage is 18 cents an hour.

Machine cleaners are boys who take apart the machines and remove foreign matter. They take off the cams, pull out the needles, pick out the lint, reset the needles, dust, clean off the lint, and remove the surplus oil that has accumulated in oil pockets. They then reassemble the parts. As this work is done little by little, the worker need not know the machine thoroughly, but it gives a splendid opportunity to a boy to learn the machine and its action.

As cleaners and oilers are expected to become repairers and adjusters, their educational, mental, and physical qualities should be the same as for these positions. Boys doing this work are 18 to 22 years old. The average rate is 18 cents an hour.

Truckers are young men who deliver the materials, threads, and garments to the various departments. They may be required to follow written orders, so must read, write, and understand English. They are expected to have a fair knowledge of the goods they handle so as to know when orders or requisitions are properly filled. Aside from that, the work is manual. In the washing and bleaching department, and to some extent in the brushing department, these boys share the regular work, but in most cases they act as errand boys. Strong, active young fellows of 16 to 20 years do this work. Rates are 15 to 20 cents an hour. Truckers are employed in all departments. Their responsibility varies somewhat, but in the main the requirements are the same.

KNITTING DEPARTMENT.

The knitting department has two main divisions: (1) Winding or spooling the yarn and (2) knitting the various fabrics.

Spooling is winding the yarn onto spools or cones used in the machine. The worker finds the end of the thread on the cop, runs it through a tension and guide, and ties it to the spool or cone or to the thread already on. She watches the spools while the machine

is running and ties threads when they break, usually without stopping the machine until the spools are filled. She then stops the machine, removes the spools, and marks grade and color number on each with a pencil according to a system indicated on the card accompanying the yarn. She then refills the spindles with empty spools and repeats the work. An experienced worker may tend 20 or more spindles, according to the grade of work. These workers spool all kinds of thread as a rule, but artificial silk, the most difficult to handle, is given only to the most careful and skilled.

Girls learn this operation in a few days under the direction of an experienced worker. Except that it helps in acquiring a knowledge of the kinds and grades of yarns, this operation does not prepare for knitting, which is the most highly skilled work. The worker is required to be on her feet most of the time, but moves back and forth before her machine and occasionally sits for a time. Hence there is no particular physical strain.

Workers must be able to read and follow written directions, mark the spools as they are taken from the rack, and make out the time slip at the end of the day. Experience is not required. Girls 18 to 20 years old, many employed as wage earners for the first time, do this work. Wages are 12 to 17 cents an hour.

Knitting is graded by gauges to suit different kinds and weights of yarn. There are three general classifications—heavy, medium, and light weight—though the variations within these range from coarse heavy fabrics for sweaters to the lightest summer-weight materials. Yarns are made of wool, cotton, and artificial silk. These are used singly and in combination.

The machine operative selects spools having the quality of thread according to the requisition which goes with each piece of work, places them on the machine, ties the threads to the proper ends in the machine, places them in the tensions and guides that carry them to the needles, and starts the machine. She watches it as the knitting goes on, ties broken threads, and picks up a run-out if the yarn breaks or falls off the needles. She makes minor repairs or reports for repairs machines making defective cloth.

A machine has one or more spools, according to the combination of threads desired. The usual number is about eight. One operative tends four to eight machines, usually six. She watches the threads and replaces spools before they are empty to avoid a run-out.

Fabric is made in a tube, of continuous length, and cut from the piece on the machine only when the roll is completed. The worker examines it from time to time by pulling it off the roll and stretching it to show up any defects. In case of a drop stitch, thread out, or other defect due to the machine she reports the defect to the machine

repairer. She removes the lint from the machine several times a day, as it accumulates rapidly and clogs the machine.

Knitters are held responsible for the quality of cloth and the number of defects allowable is limited to an equivalent of so many yards of fabric. The work makes varied demands and is not monotonous. The worker stands, but is not confined to one machine nor one position, and when machines are running smoothly or she is examining the fabric she sits for a time. Ordinary good health and average strength, sufficient for removing rolls of cloth from the machines, are required. Good eyesight, which will enable her to notice defects, is necessary.

The average machine for making undergarment fabrics has about 1,000 needles. The machine averages about 50 revolutions a minute, and each needle makes 8 stitches for each revolution, a total of 400,000 stitches a minute. Operatives must be skillful. Good judgment, alertness, and good eyesight, which will enable them to detect imperfections quickly and identify accurately the colors and grades of yarns, are necessary. Skill in manipulating delicately adjusted machines is essential. No one under 18 is employed, as this work requires mature judgment. Each factory trains most of its operatives under a skilled knitter. It requires from three to four weeks to learn to operate a knitting machine and make fabric with only a reasonable number of defects, and six months or more to attain assurance and skill. Workers learn on one type or weight of fabric and rarely change to another.

Ability to follow written directions accurately, and familiarity with all kinds and grades of yarns and the marks which identify them, are necessary. A skilled operative can knit 400 to 600 yards a day. Piecework rates are paid, according to pounds and grade of fabric, the worker receiving 15 to 22 cents an hour.

WASHING, BLEACHING, AND FLEECING DEPARTMENT.

For washing and bleaching automatic machinery is used almost exclusively. Some fabrics are boiled, washed, and bleached; some are boiled and washed. For each grade of fabric a special formula for water, soap, or bleach is used. There is little subdivision of the work.

WASHING.

Washing is done by men, who tend the machines and do the trucking and cleaning. For the washing process the operative sews the two ends of the roll fabric to make it endless, fills the machine with fabric, turns in the water, steam, and soap, and watches the machine while the washing goes on. He removes the fabric and loads it into the extractor, or into a truck to be taken to the extractor, which may

be operated by another person. He must understand all the operations and the various fabrics and solutions. Considerable judgment is required to know when processes are completed for each grade of goods. He oils and cleans his machines.

Washing is done under the direct management of the foreman, who is responsible for all work of this department. He must know all the operations which he directs, the different fabrics, and the temperatures and length of time required for each wash and each kind of fabric. He must understand the machinery and be able to manage his men. The workers must know the processes sufficiently well to report difficulties to the foreman as soon as they arise. The men are 21 years old or over and receive $17\frac{1}{2}$ to 26 cents an hour. They should have good physical make-up and be able to stand heavy lifting and dampness. They have no written orders to follow and no record of work to turn in except the time slip for the day.

BLEACHING.

For bleaching, the operative sews the ends of the fabric to form a continuous rope, which remains in this form throughout the process. He feeds and empties the machine, turns in the water and chemicals, regulated by a gauge for each bleach, puts in the bleaching fluid, and watches the machines while the process goes on. He operates from one to three machines and makes minor repairs.

The men must know in a general way the various methods of bleaching the different kinds of cloth and be able to carry out instructions according to formula. They are responsible for temperature or amount of water, and must know enough about it to report to the foreman when things go wrong. They must be 18 years old or over. The foreman works with the men, but carries the responsibility of the work. He necessarily has greater ability than the men he directs, and is paid a higher wage. He directs the mixing of the bleaches and is responsible for the accuracy with which formulas are used. The men are paid $17\frac{1}{2}$ to 25 cents an hour.

FLEECING.

Fleecing is the process of napping the heavier fabrics for fleeced-lined underwear. It is responsible work, being done with complicated, powerful machinery, and only men of good judgment are employed. The work is divided into three processes, turning the cloth, fleecing proper, and folding it. Each is done on a special machine operated by men and boys. The physical and educational requirements are practically the same as for washing and bleaching. The workers handle a large quantity of material and stand much of the time, so should be vigorous and in good health.

Turning the cloth inside out is the first operation. The roll of fabric is put over a hollow cylinder resembling a large pipe, and is turned by being carried through the cylinder. The men who operate this machine assist in listing the fabrics sent to other departments and know in detail the grades of fabrics and the processes they are to pass through in this department. They know those that have to be turned from those that do not. This work may be learned in a short time. Young men are employed at 15 cents an hour.

The fleecing machine operative sews the ends of the fabric so that it runs continuously through the machine, and watches the machine while it is in operation. He must understand different qualities of fabric and the fleece for each, and know when the machine is regulated properly. He cares for and oils the machines. He keeps account of the rolls brushed and the time spent on the work, so must be able to read, write, and understand simple English. The fleecing machines are complicated, and only careful, intelligent, and reliable men are employed. Rates are 17½ to 25 cents an hour.

Drying. The operations in the drying room are drying, rolling, widening, and folding. Washed and bleached fabrics are dried in an automatic drying machine, the temperature being about 140° F. The worker moves into position before the drier a truck of wet fabric, inserts the spreader in the fabric, and fastens the ends of two pieces together so that it runs into the machine continuously. She tends two machines, starts and stops them, and watches the fabric as it is passed over the carrier and distributed automatically on the traveling racks of the machine. She must straighten out fabrics that tangle in the drier.

An operative at the end of the machine where the fabric emerges sees that it piles properly as it leaves the racks and puts it on a table for the trucker. These women handle about 50 rolls of cloth a day at about 35 pounds to the roll. It is largely manual labor, for which no knowledge of fabric, reading, or writing is required. Strong, active women, middle-aged as a rule, are employed. The work may be learned in a few hours. Wages are 11 to 15 cents an hour.

Rolling. The cloth is rolled before it is widened and folded. A girl places the cloth on a table near the rolling machine, puts the spreader into one end, inserts the end of the fabric in the rolls of the machine, starts the machine by a hand lever, and watches the fabric as the rolling goes on. She takes the finished roll from the machine and puts it on a table ready for widening. She does 75 to 80 rolls a day, of about 35 pounds each, handling each roll twice. She sits at her work during the rolling, which occupies about half her time. Rates are 11 to 16 cents an hour.

Widening. During the washing, bleaching, and drying the fabric is handled loosely and, as it is very elastic, the width varies in the same roll and must be made uniform. The operative takes a roll of cloth and inserts the end into the machine which makes it the width desired. After the fabric is brought to width, this machine winds it into rolls. During the widening, the operative uses a measuring stick to test for uniform width. She starts and stops the machine, and must be able to stop it quickly if the cloth is not measuring up properly. She must know the fabrics of different qualities and the width necessary for each according to printed directions on the accompanying tag. She learns this operation at the machine and is given the work, as a rule, after serving at the rolling.

Average health, good judgment, and reliability, and ability to read and follow simple printed instructions are necessary. Where foreigners are employed, they are taught to read the figures and directions for widening. Rates are 15 to 20 cents an hour.

Folding. After the fabric is widened it is laid in folds about a yard in length and allowed to "set" ready for cutting. The worker puts a roll of cloth on the machine and starts the end over a rack which swings it back and forth and drops it in folds on the table. As the cloth swings, the worker guides the folds with a stick. She removes the folded cloth and repeats the process with another roll. She alternates the folding process, at which she sits, with putting rolls on the machine and piling up folded cloth. Only girls in good health are employed. Little skill is required, as the lengths of the folds need be only approximately uniform and the motions are sufficiently rhythmic to be learned easily. The work is done by girls 18 or over who have been rollers. Piece rates are paid, the girls making 11 to 15 cents an hour.

CUTTING DEPARTMENT.

Cutting is nearly all done by women, though much of the designing is done by men, usually managers or department foremen. Garments are cut singly by large shears, or by the electric knife.

The work is divided on the basis of weight of fabric into three grades: heavy, medium, and light. Differences in the styles used for these make little difference in the labor of cutting, but the weight of the fabric affects the work very noticeably. The physical effort used in lifting garments of heavy fabric and the force needed in the use of the shears in cutting the heavy cloth are considerably greater than required for light-weight fabric. The last named is difficult to manage, as it crawls under the knife or shears more easily than does medium or heavy fabric.

Hand cutting. The cutter pulls a length from the folded fabric, examines it for imperfections, lays it on the cutting table, measures it

by an adjustable gauge fastened to the table, and cuts off the amount required for the garment. She turns the fabric inside out and spreads it on the table for cutting, avoiding imperfections and taking care not to stretch the fabric. She then lays the metal pattern on the cloth, marks around it and cuts each part separately. In cutting garments by hand the body of the garment is cut first and the gores and sleeves are cut from the pieces left. The plan for cutting the garment is worked out by the designer so as to use the small parts, as the economical use of cloth materially affects the profits.

The cutter must know the styles that are made in each weight of fabric, for she is expected to cut all styles; some factories have 80 styles, ranging in size from 1 to 9. She cuts according to instructions, and so must be able to read and interpret style numbers, sizes, kinds of fabrics, etc., as designated in the directions given with requisitions. She must know the grades and kinds of fabrics, and how to avoid defects in the cloth. Knitted fabrics are very elastic, and workers must exercise care, for dragging or stretching would cause variations in the length of garments.

Good eyesight, good judgment, and close attention to details are essential both in handling the fabric and in cutting. Keen, alert, healthy young women are preferred for this work.

These workers are taught in the factory by skilled cutters who have the ability to teach others. A limited number of styles are learned in two to four weeks, after which the worker is put on regular work under direction. There must be improvement for four or five months to attain the skill necessary for a really efficient cutter. The number of dozens that a cutter may turn out daily varies according to style and size of garments. The work is done on a piecework basis, and pays $17\frac{1}{2}$ to 25 cents an hour.

Cutting by the electric knife is done by the method already described under garment trades.

The marker inspects the cut garment for any defects that may have passed the cutter, measures for lengths and shaping, and marks all parts to guide the stitchers in their work.

As the worker follows printed directions she must know the style and size numbers found on a bundle of garments and verify them with the directions for that style. The work requires intelligent, alert girls, with good judgment and sense of responsibility. Training and skill necessary are less than for cutting, but this worker must know the details of cutting in order to check up work. Piece rates are 12 to 18 cents an hour.

The forewomen assist the foremen. They instruct new workers, usually on one style, and follow them up until they have sufficient skill and confidence to work without assistance. They assist in following up the work to see that it is properly done and cared for, and

in the inspection of finished work. They are chosen, as a rule, because of ability in directing people, steady and long service in the factory, and willingness to assume responsibility. Their main duty is to help the operatives. There is no stipulation as to age, though few women under 25 years have the experience and sense of responsibility necessary. A wage considerably higher than the rate for piecework is paid.

Finishing. In the underwear industry the actual making of the garment is called finishing. The term is not used in the same sense as in other lines of work. The handwork done on knitted undergarments is examining and mending.

Less single-needle plain stitching is done than in other garment industries. This is because knitted fabrics require elastic seams. There are special machines, and subdivision of work is based largely on the type of machine used for a given process.

Many of the machine processes are used in other branches of garment work, but a special adjustment is required for sewing knitted cloth, which stretches at the slightest pull. A corresponding demand is made upon the worker in handling the fabric so as to preserve the size and shape of the garment, as in certain operations it may be totally ruined.

As already stated, cotton, wool, and artificial silk yarns, of various grades and weights, are used alone or in combination. Though the various textures require different methods of handling, the work is divided according to weight of cloth. As a rule, workers make garments of practically one range of weight only. The medium weight fabrics are the easiest to handle.

Certain qualifications of workers in the finishing department are much the same for all. An even, deliberate manner of work is much more desirable than the quick, nervous, jerky manner which the excitable person is apt to adopt. Executives say that the former turns out a greater and more nearly uniform product than the latter. Good eyesight is essential, especially in operations requiring rather constant attention, although after the learning period close attention is not required to any great extent. Since machines are built to suit persons of average height, such persons probably work more comfortably and easily than shorter ones. In some operations large quantities of material are handled, for which average physical strength and good health are essential.

It is a question of opinion, since no scientific tests have been made, as to which gives the greater comfort to the worker—the change of going back and forth for work, or steady work in one position with short recess periods for rest and relaxation. Some foremen think better results are gained by allowing each operative to be responsible for obtaining and delivering her work.

No two sewing operations require the same degree of effort and skill. In some the work is done almost wholly by the fingers, the body being used very slightly, while in others the arms, shoulders, and back play an important part. In all processes the feet are used for the treadle and the knee raises the presser foot. The machine responds so easily to the pressure of the foot that little attention is given to this after the first few days. Other processes, especially seaming, require skill and thought, reasoning ability, and judgment.

There is also a difference in physical demands upon the operatives who do short stitching, as in sewing on labels, or square stitching requiring frequent and quick stopping of the machine, and those who do longer rows or lengths of stitching.

In many instances operatives who fail at one or another of these types of sewing succeed at the third. This is a factor which could be studied with profit to all concerned.

Mental qualifications to a considerable extent parallel the demands upon skill. Operations purely manipulative require less mental ability than those that need attention and thought with every operation, especially during the learning period. The ability to read and write, to keep account of coupons for work completed, and to understand and follow printed and oral directions is needed in all operations. All workers are expected to recognize imperfections in the work or the fabric and to turn them over for mending before the garment is finished, thus avoiding defective product.

In most factories the operatives are not allowed to make adjustments. This work is done by a machinist who adjusts all machines to certain standards as necessary. In this way the work is made uniform as far as the machine's part of it is concerned.

In operating the machines used in making knitted underwear the worker must detect and report imperfections caused by the action of machine or threads. This means close, but not strained, attention to the work, to the machine, and to the threads, one to six in number, and prompt action when emergencies arise. Some causes of defective work are broken thread, a broken or improperly set needle, clogging of thread, accumulation of lint, or too loose or too tight tension. For any of these the machine must be stopped promptly. A common cause of imperfections is defective needles, which are usually replaced by the operative.

Joining shoulders is laying the front and back of the shoulder together, lapped as for a wide welt-seam, and sewing them with two rows of interlock stitching. The same worker puts on the button strip; one edge of the garment and the edge of the strip are butted and sewed in a flat seam with the interlock stitch, which joins the parts firmly and covers the raw edges, which are not

turned in. She binds the edges of the leg gores with the same stitching.

She must know how to lap shoulders and must make the laps uniform, must bring the right side of the cloth to the outside of the garment, must put the button strip on the proper side, and must make rights and lefts for each garment. She must know that the parts she is handling are cut right and without defects, turning back imperfect pieces to the cutter. In the hands of even the most skilled worker this operation, varying with the many styles, can not become sufficiently automatic to be done without attention and thought. Hence the work requires attention to details and intelligence as well as skill.

Women 25 to 35 years old are employed for this work. Wages are from 17½ to 24 cents an hour on a piecework basis.

Seaming is putting the garment together with the overlock seaming machine. The number of parts and the complexity of the work vary with the different styles. The main operations are sewing on gores, making seams, putting the parts together and setting in the sleeves. The worker places the edges to be seamed under the needle of the overlock machine in the same position as for a plain seam on a single-needle machine. The machine sews and covers the seam and trims off surplus raw edges in a single operation.

The parts to be seamed must be held in such a way as to preserve the shape of the garment. As the operative works she must see that the right side of the fabric is turned out and that rights and lefts are made for every garment. This combination of details requires judgment and skill as well as knowledge of how the garment should look, for poor work may destroy both size and shape of the garment. The work demands, therefore, skill in handling the fabric and close and constant attention to details which, in turn, demand thoughtful care and intelligence. Women 20 to 40 years old are employed. Piecework wages are 17½ to 25 cents an hour.

Cover seaming is stitching put over the joined seam to strengthen it and make it lie flat. It is done on a cylinder three-thread interlock stitch machine. The worker lays the seam over the cylinder and the guide which spreads the seam open as it passes under the needle. She guides the garment as it passes over the cylinder, and turns it right side out ready for the operations that follow. This work does not affect the shape of the garment and requires much less manipulation and judgment than seaming and joining. All seams are covered in this way. Women 20 to 28 years old do this work, piecework wages being 17½ to 26 cents an hour.

Cuff edging is putting on an overlock elastic overcasting stitch on the bottom of sleeves, vests, and drawers. Single-ply edges are run

through the machine much as a plain seam is made, and the edge is covered with a stitching which finishes it and keeps it from fraying out. The worker guides the fabric so as to avoid stretching it. Women 18 to 25 years old do this work. Wages on a piecework basis are 17 to 25 cents an hour.

Cuffs, neckbands, and armhole bands are put on with overlock or triple interlock machines. Where the overlock is used, it is supplemented by a second operation; the worker sews the cuffs to the garment as in the seaming operation on an overlock machine, stretching the edges of the cuff slightly to make it fit the sleeve. Usually, however, cuffs are put on with triple interlock machines. Some guide marks are used for this work. The shape and finish of the neck and armhole are almost wholly dependent upon the operative's skill, and require close and constant attention which skill, however great, can not eliminate. Qualifications are practically the same as for seaming. The work is done by women 25 to 35 years old. Piecework wages are 18 to 28 cents an hour.

Buttonhole facing is putting the facing on the buttonhole side of the front opening of vests and union suits. The two-needle machine carries a band of cotton cloth through a guide under a wide presser foot, and the two edges are sewed to the garment at once. The operative must see that the facing is on the proper side of the opening and that the edge is turned in as the facing is stitched on. Though this seems simple, it requires a good deal of practice and skill to become an efficient worker, as the band is stitched on the length of the fabric and is therefore difficult to manage. Women 20 to 30 years old do this work. On a piecework basis it pays 18 to 24 cents an hour.

Front edging is finishing the neck and front of boys' and men's wear with a special two-thread zigzag or purl stitch, which covers the edge like a binding, strengthens it, and gives it a neat appearance. The worker holds the garment so that the edge passes under the presser foot like a plain seam, and a guide regulates the depth of the stitching. No parts of the garment are held together for this work, and skill is easily attained. Women from 18 to 35 years are employed. Piecework wages are 18 to 23 cents an hour.

Lace sewing is stitching lace edging on drawers and light-weight cotton union suits. A special zigzag stitch is used, which in one operation purls the stitch over the edge of the fabric and stitches on the lace. The worker lays the lace and edge of the garment under the presser foot, as for a plain seam, special guides regulating the depth of lap. Lace is cut to predetermined lengths, considerably longer than the edges to which they are to be attached, so garments are stretched to the length of the lace as the stitching is done. Judg-

ment in respect to stretching or holding in the fabric to measure is necessary. Women 20 to 25 years old are employed. Piecework wages are 18 to 28 cents an hour.

Neck edging is binding the neck edge of women's garments with a double interlock stitch, preparatory to shell-stitch finish. It is done on a single shaped edge of the garment, hence may affect the size, and to some extent the shape, of the neck of the garment. This stitch is also used on the bottom edge of loose-knee garments. There are no measurements to guide the worker, so skill in handling the fabric and a good eye for approximate measurements are necessary. Women 20 to 35 years old are employed. Piecework wages are 18 to 24 cents an hour.

Shell finishing is trimming neck and armhole and bottoms of loose-knee garments with a crocheted shell stitch of silk or mercerized cotton thread. The worker places the garment, previously edged by the overlock machine, under the needle and feeds it against a guide which regulates the depth of the shell stitching. The quality of work on this operation may affect the shape of the garment, but it is largely a manipulative operation. Women 20 to 35 years old are employed. Piecework wages are 18 to 24 cents an hour.

Hemming is little used; edges are finished usually with an overlock or binding stitch, which covers and strengthens the single edge. Hemming is done on the overlock machine. The operative folds the hem and lays it back over the garment, and places the edge of the hem and the fold in the garment under the presser foot like a plain seam. She stretches the fabric, which is stitched crosswise of the material, so as to allow the finished hem to give when being worn. This operation is much like seaming and putting on cuffs with the overlock machine. Women 20 to 35 years old are employed. Piecework wages are about 25 cents an hour.

Labeling is sewing the labels on the inside of the back of the garment near the neck line. **Square stitching** is sewing the buttonhole side of the front over the button side by a single-needle machine, making a square or rectangular line of stitching to strengthen the bottom of the opening. The label operative determines the position of the label by eye measurement and sews around the four sides. Although seemingly a simple process, workers frequently find this difficult, chiefly because of stopping the machine quickly or at exactly the right time, so that stitches may not run over the edge of the label. Stopping the machine is not heavy work, but it requires quick and frequent action. Square stitching makes practically the same claims as labeling. Women 20 years old or more are employed. Piecework wages are 18 to 24 cents an hour.

Buttonhole making and button sewing are the same as in other garment trades. They are done by women 20 to 35 years old. Piecework wages are 18 to 26 cents an hour.

Budding is staying or tacking the ends of seams and gores to strengthen places that may rip or tear in wearing. Except that a button is not used, this is practically the same as button sewing; the machine is operated in the same way and the responsibility on the part of the worker is the same. Acquirements and wages are practically those of buttonhole making and button sewing.

FOLDING AND BOXING DEPARTMENT.

In this department garments from the finishing room are folded by hand and pressed by machine ready for packing for shipment. Though practically one job, the work is usually divided among three persons. One folds the garments, another operates the ironing machine, and a third takes the garments as they come from the machine and piles them in order. There are also cleaners, who remove spots with gasoline or other cleaning agents. Various methods of pressing are used, practically all done by machine.

Folding the garment is getting it ready for pressing. The worker buttons the garment; flattens it out by following the seams of the body, legs, and sleeves; stretches the seams, if necessary, to make the garment lie flat; then folds it and places it on the ironing frame. This work, which varies somewhat according to the style of garment, is not difficult. It requires good judgment and strength, as it involves reaching, lifting, and vigorous use of the hands and arms. Workers make up their time for the day's work and list coupons, so must be able to read and write. Girls doing this work are 18 to 20 years old. Most of them live at home. Piecework wages are 17 to 21 cents an hour.

Pressing is done by machine. The operative fills with folded garments, smoothing or stretching them slightly into straight lines, an iron frame with canvas laced to the four sides; she lays the frame on the table of the pressing machine and pushes it to the point where the machine, which she starts by a treadle, takes hold of it automatically. The machine feeds it in under the buck, which rises, forcing the frame against the heated plate, where it is held for a predetermined length of time, and opens.

The frame is automatically pushed out as another takes its place in the machine. The garments remain in long enough for the next frame to be filled; hence this work is practically continuous. A second girl removes the garments and piles them in order, ready to be taken to the packing room. The girls should be rather tall, strong,

and active, as the table of the machine is high and the frame large, cumbersome, and somewhat heavy.

The operative must know how to start and stop the machine. She must read and write, so as to follow size and style numbers and keep in order the garments she handles.

This work is more responsible than folding and most of the girls have served as folders. After folding is understood it takes only a few days to learn to operate the machine without delays. Learners are taught by experienced operatives. Girls of 18 to 20 do the work. Piecework wages are 18 to 22 cents an hour.

Boxing is packing the finished garments in pasteboard boxes. The worker gives each garment a final inspection for imperfections that may have passed other examiners, checks the measurements by those of a standard garment, and piles them by size. She packs from two to six garments in a box, according to size and style numbers as indicated on garments and boxes.

She must know how to handle garments so as to keep them fresh and clean, and must recognize defects quickly. The work involves standing, some lifting, and walking back and forth. Girls should be strong, active, and alert. Reliability is an important qualification, as garments go from this department to the customer without further inspection. Errors in count, labels that do not correspond, and imperfections in workmanship or fabric which may come to the customers' notice are bad business, and these workers must take every precaution to avoid errors. Good eyesight and the ability and desire to attend strictly to business are necessary.

Sufficient knowledge of reading and writing to make out time slips and read numbers and names is required for everyday routine, and general intelligence of a higher degree than can be determined by the actual reading or writing employed or the arithmetical processes used undoubtedly is demanded.

Girls of 17 to 22, just out of school or other lines of employment, are chosen for this work. They are taught in the factory by the head inspector or another competent worker, in whose care they are placed until they can be trusted to work alone. They are paid hourly rates ranging from 13 to 17 cents.

Box labeling is pasting printed labels on the pasteboard boxes into which the garments are packed. The worker gets boxes from the stock room, piles them on a rack, dips the labels on a pasting board and pastes them on the boxes. She places all in one position and at one angle so that when boxes are piled up the labels are in straight rows. When the labels have been put on, she stamps the size on each label with a rubber stamp and piles the boxes in a convenient place for the boxers. She mixes the paste and cleans the pasting board and table at the end of the day.

Qualifications are much the same as for boxing. Thought and responsibility are required, especially in putting numbers on boxes so as to avoid error. As labels and numbers on labels are placed without guide or measurement, the worker must have a good eye for line and spacing. Young inexperienced girls are employed and are trained for the work in a few days. They are paid an hourly rate of 15 cents.

Head inspectors make a special inspection of all work done by the boxers. They look over the boxes that have been packed, pass judgment upon defects detected by the boxers, and O. K. the boxes before they are sent to the shipping room. They must have a thorough knowledge of all the styles, sizes, and qualities of garments made and know the standards for which the factory stands.

This worker, standing between the public and the factory, must be intelligent and reliable, and her work must be accurate. A good memory is essential. She is usually chosen from the examining division, where she has become familiar with the garments and the workmanship. Education as described for the boxers, with capacity for directing others and passing judgment upon unusual as well as regular work, is necessary. Physical qualifications are the same as for boxers. Women of about 20 are employed. Hourly rates range from 18 to 24 cents.

In some cases the superintendent looks after the hiring of new help. In larger plants the work is subdivided and done by several department heads. A written application, stating name, address, age, nationality, working experience, and home responsibilities is required in some factories. Previous experience is not required for any position under the grade of foremanship, though persons having had experience in other lines of knitting or knitted-garment making are employed. Personal appearance, good health and physique, and such factors as "common sense," "means business," "active," "bright," are enumerated as points of consideration.

All inexperienced workers are given a minimum of instruction in one process and if they make good are placed on the regular staff. Those who can not reach the standard drop out or are dismissed.

A worker is tried out at an operation with no idea of her fitness other than the judgment of superintendent or executive, who through experience is considered capable of selecting persons for the different classes of work. If she fails to make good at one operation she may be shifted to another, but workers, especially beginners, are rarely shifted to another department to see if it may offer work better suited to their ability.

The failure of workers to qualify is often due to discouragement because they can not learn the work in a few hours or days, and a

large number leave when their chances of success seem good to those in charge. A study of the workers shows the largest proportion dropping out in those occupations which require the greatest skill and highest mental ability. Some effort is made by those in charge, when placing new workers, to classify them in positions requiring unskilled, semiskilled, or skilled workers, but this is the result of observation rather than definite tests.

There is clearly a waste of money for the employer and discouragement as well as waste of time, money, and energy for the young people in this method of selecting and placing workers. Without doubt there are shifters in all lines of work and among women as well as men, but much shifting is due to misfits. Comparison of the requirements for some jobs with those for others shows good reason why large numbers should drop out. The "turnover" of labor in factories further verifies this.

As to promotion, foremen and forewomen, teachers and inspectors usually are taken from the rank and file. In this sense promotional capacity is recognized and rewarded. With the bulk of workers, however, these positions are too distant to encourage many ambitious young people. Promotions from minor positions to others a little higher also exist, but incidentally; for example, menders are promoted to some line of stitching. Packing or boxing is considered good preparation for stitching or cutting, as the boxer learns how the garments should look when finished. Helpers at pressing may become ironing-machine operators and thus increase their responsibility and wage somewhat, but wages for work of a higher grade frequently are too little in advance of those already received to make the change worth while.

Employers say that workers do not want to shift from one operation to another and credit this to indifference or timidity. This may be true in some cases, but does not apply to all. The greater difficulty probably lies in the fact that trade advancement and increased wage are too little to warrant taking the risk.

Promotion might be provided for, to the advantage of the industry and the encouragement of higher standards of workmanship among the employees, if the operations in each department were classified according to (1) skill required, (2) intelligent workmanship, as in putting a garment together, or quality of work affecting the shape of the garment, (3) responsibility involved, and (4) amount of work turned out. This is especially true in finishing and cutting departments, for which a background of technical and trade knowledge is required, though at present only partly recognized.

The occupations in these departments offer educational possibilities that can be handled to some extent in a preparatory course. Better standards and ultimate saving in expense and labor could

be gained by cooperation of the school and regular employment in the industry, which has been begun. One large establishment is studying a scheme for selecting and placing employees in the various occupations which will take into account the education and other qualifications of applicants. If carefully planned and carried out this should do much to eliminate the possibility of "misfits" and should give those interested in advancement a greater chance to get ahead.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

Those engaged in the knitting business agree with the survey staff that so far as the school is concerned the only occupations in the knitting mills for which training could be profitably given at present, at least, are those of the machine repairers and adjusters and of the operators of the various kinds of power sewing machines.

It would seem that boys who take the two-year course in machine-shop work at the Dunwoody Institute would furnish promising material as assistants or apprentices to the machine repairers and adjusters. In the school these boys learn many things which would be invaluable to them in the repair and adjustment of knitting-mill machinery. They learn free-hand and mechanical drawing and the reading of blue prints. They learn to use the round of machines of the machine shop, to make repairs of all kinds, and to adjust mechanism so that they will operate successfully. In the classroom they get, in addition to a general education, the theory, the mathematics, and the mechanics of power and machinery.

The machine repairers and adjusters already in the knitting business should also find in the evening classes given in the Dunwoody Institute, which have grown out of the survey, a chance to get training in the drawing, the mathematics, the mechanics, and the actual operation of different kinds of machines used in repair work such as the grinding, planing, boring, and milling machines, which will equip him for advancement in his work. Perhaps the greatest demand upon the man who repairs and adjusts knitting-mill machinery is for close and accurate work in adjustment. Much of this he must learn by practice in the factory, but there seems no doubt that the school could practically aid him in teaching him accuracy of measurement in machine work as well as the theory of mechanics. In connection with this, the survey desires to point out that it would seem advisable, in view of the large number of power sewing machines used in the city, which must always require repairers and adjusters, for the machine-shop courses of the regular

high schools and the Dunwoody Institute to include some training in the repair and adjustment of power sewing machines.

It does not appear to the survey committee that there is any training which the vocational school can give in day, part-time, or evening classes which would be of any benefit from the standpoint of efficiency and greater wage earning to the workers in the knitting mills who are engaged in the spooling and knitting; in washing, bleaching and fleecing; and in pressing and boxing. The work of these occupations, with the exception of the boxing, is performed almost entirely by machines, more or less automatic, which the worker learns to tend in a short while, and the brief training required at the outset as well as the skill gained by constant practice can best be given in the mill itself.

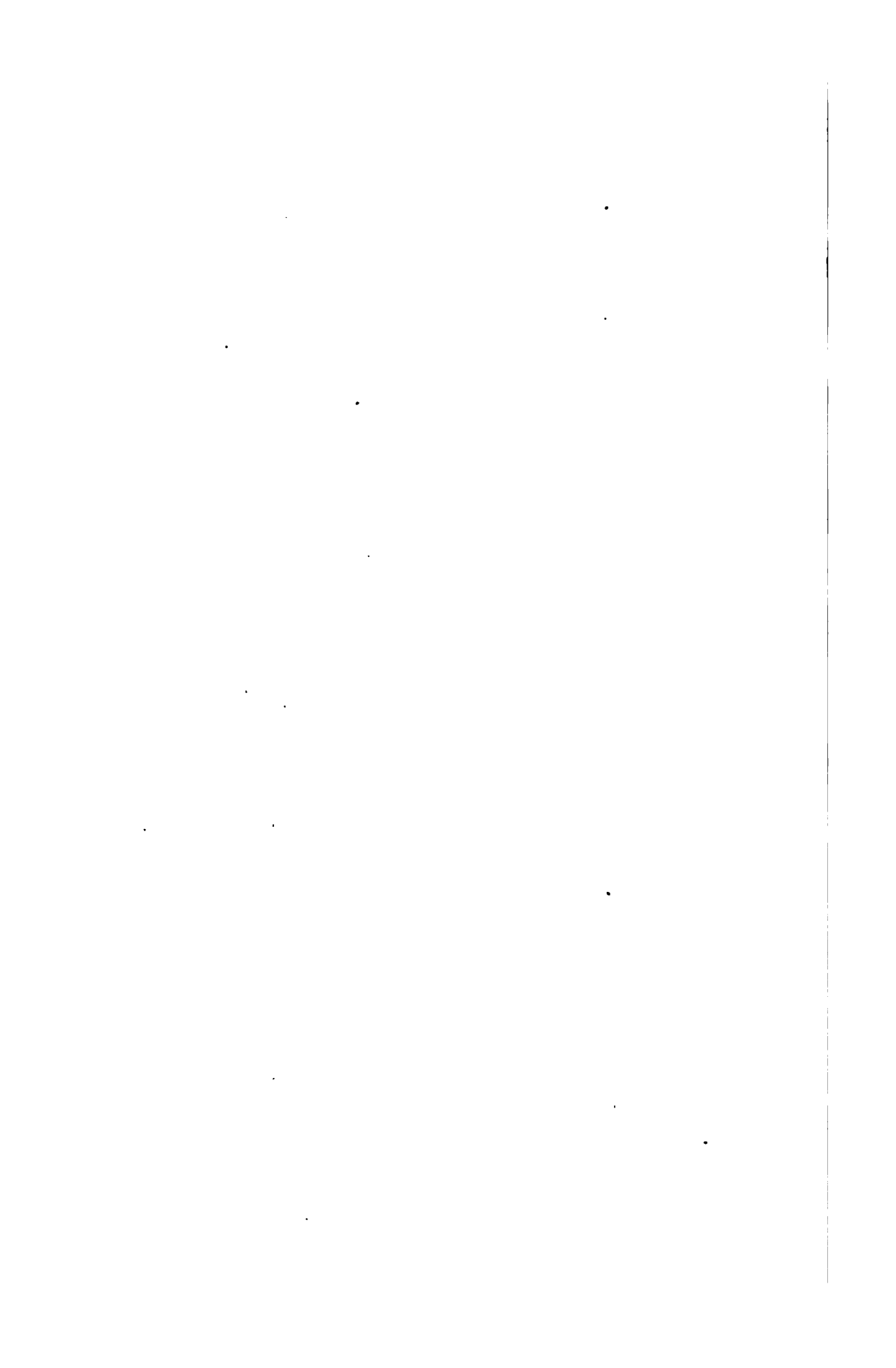
On the other hand, it appears to the committee as very doubtful whether the public vocational school will be able, at any rate in the near future, to train successfully for the occupation of cutter in any of the garment trades. Skill in this work would require a great amount of actual practice in cutting materials which the vocational school is not able to furnish at present, at least. Cutting is a highly specialized occupation, differing widely in its requirements according to the kind of material and kind of garment made, and preparation of new workers is best accomplished by a helper or apprenticeship system in the manufacturing plant.

The vocational school, however, can give preliminary training which would be beneficial to the machine operator in the knitting mills as well as in all the other garment trades. The pupils of the course would be a selected group in the sense that they had elected machine operating as an occupation and had given two years of occupation for it before becoming wage earners in it. In addition to a good general education, valuable to any girl, the girls of the machine operating class of the Girls' Vocational High School will get a great deal of practice in the fundamentals of machine operating, such as starting and stopping the machine, care of machine, setting the needle, adjustment of tensions, and care of the threads on the machine. They will also learn hand mending and various kinds of stitching and seaming, such as plain single-needle stitching, overlock and interlock stitching, buttonhole making, and button sewing, making plain seams, covering seams, edging, and the handling of the fabric in all these various operations and combinations of operations.

During the latter part of the course in machine operating the girls who are going out to factories making a different product should have an opportunity, either in the school or in the factory or in both, to get experience with the processes and materials in which they are to deal later as paid operators. Some of the special

machines used in the knitting mills should be in the school; and by co-operation between knitting mills and the school the girls who will go to the mills later as paid workers should be given a chance to get some experience under commercial conditions. This will make the work of the school a real apprenticeship training for the industry.

By trade understanding between the school authorities and the knitting mills, made as a result of the survey, the knitting mills have agreed to use the Girls' Vocational High School as a source of supply for new machine operators. The girls who are graduated at the end of the two-year course are to be employed in the knitting mills at not less than \$8 a week, the diploma of this school being withheld until proof of satisfactory service. The trade understanding for this industry is similar to the one used in the garment trades described in Chapter XIV, page 345. See also Chapter XXIII, on trade understandings.



CHAPTER XVII.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR SALESMANSHIP IN THE DEPARTMENT STORES?

Minneapolis is the largest merchandising center in the Northwest. The retail stores carry a large local and rural trade, and a number do a large mail-order business as well. Considerable wholesale trade also is centered here. Six large department stores carry miscellaneous merchandise; seven large specialty stores and a number of small ones carry only ready-to-wear clothing, such as dresses, coats, suits, shoes, gloves, millinery, lace, jewelry, and so forth. Neighborhood stores similar to the old type of general dry goods store carry a little of everything the neighborhood trade may want.

The large department stores are all in the central part of the city. Specialty stores are somewhat centralized in the downtown section, though many are found in various parts of the city. Neighborhood stores are found in every section.

These stores employ in merchandising, office, delivery, and executive positions more than 6,000 persons. Reports from 53 retail stores, including department stores, a large part of the specialty stores, and some of the neighborhood stores, show the following number and distribution of employees in the merchandising and delivery departments:

TABLE 16.—EMPLOYEES IN RETAIL STORES, BY SEX AND OCCUPATION.

[Data relative to the number of employees in retail stores were obtained for the survey by the Minneapolis Retailers' Association. The figures do not include data from one large department store which employs from 1,450 to 1,600 persons, 906 of whom are sales persons.]

Occupation.	Number of establishments.	Number of employees.		Sex not reported.
		Male.	Female.	
Buyers.....	37	124	50	75
Sales persons.....	48	544	1,281	565
Stock keepers.....	28	50	38	64
Messengers.....	22	34	66	32
Floor men ¹	27	46	1	31
Advertising.....	29	23	10	21
Alteration work.....	19	37	228	117
Office.....	51	88	307	173
Packing and delivery.....	44	249	43	162
In other capacities.....	40	290	229	228
Unclassified.....	5	39	24	54
Total.....	53	1,534	2,286	1,532

¹ Of these, 37 are employed in five stores.

Many sales persons in department stores obtained their first experience in neighborhood stores, 5 and 10 cent stores, or the general stores of the small towns from which they came. Specialty stores, on the other hand, although employing inexperienced workers to some extent, obtain many of their employees from department stores. Thus neighborhood and department stores serve, in a sense, as training schools for salesmanship.

In making this study to determine the qualifications necessary for retail salesmanship, department stores were chosen for several reasons: (1) They employ many workers; (2) a great variety of merchandise is sold and many types of selling are represented; (3) positions and their rank in department and store are probably more nearly standardized than in other types of stores; and (4) store and department organization are virtually standardized.

Neighborhood stores present fewer specific problems for study and very few that apply to department stores, while salesmanship as treated under department stores applies to practically all types of selling in neighborhood and specialty stores.

Department stores are large, their organization is complex, and their problems are many and varied. It has been the purpose of this study, as far as resources would permit, to show the possibilities of training for salesmanship; to offer suggestions as to how training should be given; to point out some of the problems to be met; and to demonstrate the need of consideration and study of the whole field.

Because of the difference in merchandise and methods of handling, certain departments have not been included in this report, though much of the general treatment of salesmanship applies equally to them. Salesmanship in millinery departments is treated in the study of millinery in Chapter XV.

Though grocery departments are found in many of the large stores, they represent a kind of work which has only within very recent years been identified with department stores. They have been excluded from this study because they differ from other departments in merchandise carried, care of stock, and methods of selling. Many women are employed, and it would seem that through cooperation of the salesmanship and domestic science departments in the Girls' Vocational High School a study of this field could be made, and that girls and women with knowledge of foods and their preparation might find this a profitable way to put such knowledge to use in wage earning.

Wage reports for store work present some problems similar to those in factory industries. Positions are perhaps more nearly standardized than wages. The custom of paying a regular weekly wage

and giving a commission of 1 or 2 per cent or more, is common in practically all departments, and, as amounts as well as rates vary, reports are difficult to obtain. Increase in wages is usually given in the form of increased rate of commission.

Of 100 sales persons in Minneapolis reporting wages, 28 reported premiums or commission received on sales. Premiums are given by some stores for the sale of certain merchandise. Practically all stock merchandise is carried in "full lines." The meaning of this term varies with the kind of merchandise, but it is generally used to designate the range of sizes, grades, and styles of any one kind of merchandise the store carries. If there are a few odd pieces left over which may not be placed with the regular stock, a premium is placed on the sale of the article, to call the sales person's attention to it and assist in making a sale. It may be new; it may be staple; it may be desirable, but less interesting to the sales person than another article which she may sell readily; it may be an article to be closed out because of decreasing demand; or it may be slightly shopworn.

The buyers or department heads select the goods to be sold in this way and set the premium on the selling price so that the sales person may know what she will receive when a sale is made. Premiums may be paid for marked-down merchandise and for that sold at full value. When used to urge the sale of undesirable merchandise it is not considered a legitimate use of a system which, in many respects, is of value to the store and of profit to the employee.

This premium money is popularly known as a "spif" or a "P. M." The amounts received range from 10 cents to \$1.50 a week. Several employees reported extra earnings for the Christmas season. Five reported commissions but did not give rates. Christmas presents of money are given by some stores, but this is not considered a part of the salary.

Buyers have the responsibility of buying merchandise and managing the departments, and receive higher salaries than sales persons, or from \$1,200 to \$6,000 a year. Some buyers of unusual ability receive \$8,000 to \$10,000. Salaries vary according to the volume of business done by the departments, the amount of stock carried, the number of employees, and other factors complicating the work of buying merchandise or managing the department.

The rates of wages reported by 100 sales persons are as follows:

TABLE 17.—RATES OF WAGES REPORTED BY SALES PERSONS IN DEPARTMENT STORES.

Weekly wage.	Number reporting.	Receiving a commission or premium.	Not receiving a commission or premium.	Amount of commission or premium received.
\$6.....	16	6	10	28 to 75 cents a week.
\$7.....	15	5	9	25 cents a week to \$6.30 a month.
\$8.....	16	12	4	10 cents to \$1.50 a week.
\$9.....	17	3	14	10 cents to \$1 a week.
\$10.....	17	6	11	25 cents to \$1.50 a week.
\$11.....	1	1	-----	25 per cent commission.
\$12.....	5	3	2	25 cents to \$3 a week.
\$14.....	4	2	2	\$2.50 a week.
\$15.....	3	1	2	4 per cent commission.
\$16.....	2	1	1	\$3 premium (no time given).
\$16.50.....	1	1	-----	-----
\$18.....	1	1	-----	On commission only.
\$20.....	1	1	-----	Do.
\$22.....	1	1	-----	Do.

The following table, from reports of 54 employers, shows the diversity of rates paid in department stores. The "lowest rate" is paid to messengers, stock keepers and inexperienced sales persons. The "usual rate" is that paid to the rank and file of sales persons.

TABLE 18.—RATES OF WAGES REPORTED FOR DEPARTMENT STORE EMPLOYEES BY EMPLOYERS.

[Employers did not report wages for occupations in specific departments or number of employees.]

Weekly rates of sales persons.			Weekly rates of sales persons.		
Highest rate.	Usual rate.	Lowest rate.	Highest rate.	Usual rate.	Lowest rate.
\$14	\$6 to \$8	\$5	\$30	-----	\$6
12	9 to 10	5	19	\$7	6
15	7	5	9	-----	6
-----	11 to 18	5	8 to 10	6	6
12	7	5	8 + 4%	8 + 4%	6
-----	8	5	9	7	6
-----	7 to 11	5	15	8	6
-----	6	6	16	12	7
-----	7 to 10	6	12	8	7
-----	7	6	9	7	7
-----	10	6	25	8 to 12	7
-----	9	6	-----	-----	7
-----	8	6	25	8	7
-----	8 to 9	6	25	8	7
-----	-----	6	-----	-----	7
25	9	6	30	18	7
25	10	6	10 to 18	7 to 10	7
16	8	6	12	10	7
18	10	6	11	7	7
15	8	6	30	25	8
10	8	6	25	15	8
8	8	6	25	-----	8
15	8	6	14	8 to 9	8
12	8	6	10 to 18	8	6
12	8	6	8	6	6
15	6	-----	25	15	10
20	-----	6	-----	-----	15

Employment is practically constant for the majority of regular store employees. They work 48 to 50 weeks a year. Aisle or bargain-square and special-sale employees generally are hired for temporary service with the understanding that they are "supplies," but

may become regular sales persons if successful and if the demand warrants taking on new workers. It is the custom to give those who have been in service for a certain length of time a vacation of one week with pay, to which they add one or two weeks' vacation on their own time. There is no period when there is no work in the department stores. No lay offs were reported by the workers, though in some cases the vacation exceeded the usual time.

There are no data to show to what extent store workers leave the store to go into work which does not require selling, but the employees' reports show little shifting except from one store to another. This, in most cases, is done for higher salary or other advantages.

Hours of work are limited to 58 a week and 10 a day, with not more than 11 on Saturday.¹ Stores in the shopping district open at 8.30 a. m. and close at 6 p. m. except Saturdays, when they close at 6.30, during the entire year, with the exception of two stores which close at noon on Saturday in July and August. Neighborhood stores do not adhere to the hours of down-town stores, but remain open the full 58 hours allowed by law and invariably are open one night in the week, usually Saturday. Some stores remain open until 9 o'clock for a few evenings preceding Christmas Day.

The usual luncheon period is an hour. Children under 16 are employed only by special permit, and few are so employed.

Retail merchandising in Minneapolis has increased materially in the past 10 years. The number of stores has grown and some of the large stores have experienced a marked increase in business. The volume of business is not reported in the United States Census, and comparative figures are not available. The specialty stores, of which there are many, have come into existence within that time, and neighborhood stores have greatly increased in number. Not only has business increased in proportion as population has grown, but the amount purchased per family is much more. The demand for workers has increased proportionately.

One point which stands out clearly in this study is that the idea that "anybody can sell goods" is no longer cherished. Employers and employees are coming to believe that the best interests of both can be served only through education and training for the work. Hence, there is an encouraging demand for trained workers. Store positions call for a wide range of ability, and advancement is possible for men and women who can qualify for the more responsible and better paid positions.

A department store may be owned and controlled by a company or by one person. If the store is owned by a company, a member of the firm is usually the merchandise manager and he may be assisted by

¹ General Laws of Minnesota, 1913, ch. 581.

a general manager or superintendent. If the store is owned by one person, the owner is usually the general manager. There are three divisions of department store work which come under the direction of the general manager: (1) office and financial division; (2) merchandising division; and (3) the service division.

The office and financial division of the store includes: (1) The financial department of the firm; (2) the accounting department, in which all business of the store is done; (3) the cashier department which makes change, and the check or bundle girls who wrap packages and return change. The financial department is managed by members of the firm. The accounting department is under an office manager, who has charge of all the bookkeeping and other records, the cashiers, credit men, including collectors and charge authorizers, bookkeepers and auditors, and the paymaster and his helpers. He directs all work of this department and, as a rule, employs workers who assist him.

The merchandising division includes: (1) The buying and selling of merchandise; (2) the advertising; (3) the interior and window displays. It is in charge of a manager, who is a member of the firm or, in the smaller stores, the owner. The merchandise manager of a corporation store may or may not be a member of the corporation.

The merchandise manager directs the buyers and heads of departments. He is the administrator for the firm in putting into practice its policies with regard to the kind of merchandise to be carried, the advertising methods to be used, the arrangement of departments, and division of merchandise.

The service division includes: (1) The employment of new workers; (2) the system of sales slips, charges, refunds, etc.; (3) the care of the building; and (4) the delivery department. It is in charge of a superintendent. He personally employs workers for the various departments and, as a rule, decides where they shall be placed. The training of a new worker is delegated to the buyer or head of the department in which he is placed, or he is instructed in the educational department. The superintendent works out, or assists in doing so, the system of sales slips, charges, etc. The care and management of the building and the departments on the floors are under his direct charge. He has charge of the delivery department, which he manages with the aid of an assistant, who is called the head of the department.

The delivery department employs two sets of workers: (1) Inspectors and wrappers; and (2) packers and delivery men. The inspectors examine sales slips and merchandise to see that amounts are correct; the wrappers wrap the goods for customers who take packages with them. These persons work in the store. The packers or shipping-room men, who work in the delivery room, rewrap or pack and route parcels for delivery to customers' homes.

MERCHANDISING DIVISION.

For the purpose of this report, the work of the merchandising division is the most important, since it is directly concerned with salesmanship. The merchandise manager is responsible for all purchases, sales, profits, and losses. He decides how funds for buying shall be apportioned among the various departments and what percentage of profit each department must make. He keeps himself informed on trade conditions and on tendencies of style. He consults with the buyers about the kinds, amounts, and prices of merchandise they buy, the prices at which it may be sold, and special sales. He has charge of any extensive changes in display of goods. He must know goods and be an accurate judge of markets for buying and selling and demand for various lines. In the smaller stores he may be the general manager.

The number of departments depends upon the size of the store and the combination of the various lines of merchandise into departments. The representative departments are silks, velvets, woolen goods, cotton goods, linens, linings, laces, embroideries, veilings, ribbons, trimmings and notions, patterns, art goods and art needlework, corsets, muslin underwear, petticoats, waists, kimonos, aprons, dresses, suits, cloaks, hats, knit underwear, hosiery, neckwear, gloves, furs, children's and infants' wear, boys' furnishings, men's furnishings (shirts, ties, hosiery, underwear, nightshirts and pajamas), gloves, shoes, hardware, china, cut glass and crockery, silverware, pictures, musical instruments and sheet music, draperies and upholstery, wall paper, rugs and carpets, furniture, sewing machines, groceries, delicatessen and meats, drugs and toilet articles, books and stationery, cut flowers and plants, trunks, bags and leather goods, jewelry, umbrellas, toys and dolls, kodaks and supplies, optical goods, hair goods.

Each department has four positions, well defined according to duties and responsibilities. These positions are, in an ascending scale of importance, (1) stock keeper, (2) sales person, (3) assistant buyer, and (4) buyer. Though the duties are similar in all departments, the requirements vary according to the kinds of merchandise sold.

In addition to the regular occupations in each department, there are messenger girls, aisle sales persons, and floor managers, auxiliary to all departments but not an integral part of any one. Though an important factor in the work of every department, their duties are not so diversified as to warrant treatment by departments, and they are dealt with in the succeeding paragraphs.

The messenger girl, as her name implies, carries messages and runs errands for nearly all persons on her floor, for example, when a

check is to be signed, orders are to be certified, or a transfer is to be carried to another department. In some departments she takes the article when sold to the wrapping desk, has it wrapped, gets the change and returns it to the customer. The nature of the work depends upon the arrangement of the store and the mechanical devices in operation.

A messenger girl should be able to execute oral directions promptly and accurately. If she is bright and seems to have the ability to learn store work, she is placed in a department as stock keeper, and eventually may be promoted to the selling force. Since such promotion is possible, her qualifications should be of the same order as for the stock keeper.

Aisle or bargain-square sales persons are employed in most department stores to sell specially advertised goods. Because this merchandise has been well advertised, the variety each day is limited and usually of one price. It therefore requires less knowledge of selling than does the merchandise in the regular departments. The girls receive some information about the merchandise, but frequently it is so hastily given that the knowledge they retain is slight.

Persons of mediocre ability may become order takers or bundle wrappers, but bright, intelligent girls with ability to learn acquire considerable knowledge of the merchandise. As they handle different goods each day, they get an idea of the varieties and qualities of merchandise carried by the departments. Since these workers are potential sales persons, their qualifications or capacity should be those required for regular sales persons.

The floor man is usually an assistant to the superintendent. He is responsible for the order in his section of the store. He directs the care of stock on the tables, sees that it is neatly and attractively arranged, and makes sure that the sale cards are in place. He need not be a merchandising man. He regulates the lighting and is responsible for the heating and ventilating in his part of the store. He assists in maintaining discipline and directs the work of the aisle force. He frequently certifies exchanges and attends to customers' complaints.

He should know the location of all departments and the merchandise in each so as to be able to direct customers to any part of the store. He is the usher, and must be polite and courteous. If any department is rushed for a few minutes he must be tactful enough to hold the customer until someone can serve her.

A good personal appearance and pleasing manner are essential. Physical endurance and right habits of standing and walking are important, as the man is on his feet practically the entire day. Occasionally a floor man is promoted to some other position for

which he seems fitted, but, generally speaking, when a man has qualified as a floor man he remains in that capacity.

DEPARTMENT OCCUPATIONS.

The stock keeper of a department assists the head of the department in checking and marking new stock in the receiving room, arranges it in the reserve stock room by kinds, sizes, or other classification, and delivers it to the department as needed. She helps in arranging stock and assists in the dusting and care of the department.

Stock keepers should be of medium size and have no physical defects when they begin work. They should know that by correct habits of standing and walking, and by wearing common-sense shoes, they may avoid many ailments due to continued standing. They should be neatly and comfortably dressed—comfortably because clothing affects the health. Good eyesight is essential, as the stock may be arranged by colors and defect in vision or tendency to color blindness would disqualify workers. Stock keepers should have a good memory for the various kinds of stock, and ability to comprehend and carry out directions.

Since the sales force is recruited to some extent from this group, not less than an elementary school education is necessary. This is not because the actual subject matter covered in the elementary grades is wholly applicable to stock keeping, but because the intelligence and judgment required to keep stock acceptably seems seldom to be possessed by young persons who have failed to show the ability required to complete the elementary school work.

Since capable young persons in such positions may acquire a knowledge of prices and quality of stock and, by observing the sales force, a knowledge of selling, they may become sales persons. As the position is a subordinate one, no great attention is given to looking for young persons with definite qualifications. If they succeed in doing the required work, they are kept; if they fail, they are discharged. However, since the sales force is recruited from these workers, and since they are in contact with the public in connection with the sales force, it seems important to require of applicants the qualifications that would be required of inexperienced persons who enter the store for the definite purpose of becoming sales persons.

The sales person has two main duties—to care for stock and to sell merchandise. She also answers the telephone, keeps a record of things asked for by customers, and assists in the semiannual inventory. The care of stock includes keeping the merchandise fresh, clean, mended, and properly sorted and arranged. But the main part of her work is meeting customers and selling merchandise.

In selling merchandise the sales person approaches and greets her customer, and finds out what is wanted. She shows merchandise. She tells its wearing qualities, uses, style, and price, its number, width, or size, and anything else characteristic of the merchandise in question. She measures off or selects the amount, makes out a sales slip, takes the money, and delivers the purchase and change to the customer, not forgetting her thanks.

In the main three different types of customers visit her department, each of which must be dealt with in a different way: The customer who knows what she wants; the one who knows that she wants something but does not know what; and the one who is "just looking." She must determine quickly to which class each customer belongs and assume an attitude of personal interest.

The first type of customer, as a rule, states her needs and all that the sales person must do is to find the desired merchandise and see that it is wrapped and delivered. In such case the customer and not the sales person has made the sale. On the other hand, if the sales person induces the customer to buy a better quality or a greater quantity than was inquired for, she has sold the difference between what was asked for and what was bought.

To the customer who does not know what she wants the sales person may demonstrate her ability to sell. Without asking directly what quality or what priced article is desired, the skillful sales person sizes up the customer, perhaps asks for what purpose the merchandise is required, and proceeds to show a quality which will attract attention and may arouse interest. As a result of this, the customer may ask to see something more or less expensive, of a different color or style. Taking her cue from the amount of interest displayed, the questions asked, and the remarks made upon the merchandise shown, the sales person decides upon which article to concentrate her energy. If she is skillful in making suggestions about the quality, usefulness, beauty, or style, she may create in the customer a desire to own the article and a decision to buy it. The person who can make a sale according to this outline is one possessing knowledge of scientific salesmanship or natural ability of a high order.

The person who is "just looking" is the potential customer and should be given most courteous attention, though this must not be thrust upon her in such a way as to annoy her or cause her to think that the sales person is unduly anxious to sell. The attention should give the impression that the sales person is ready to help the customer and that it is the customer's privilege to examine values and prices without being obliged to buy.

This customer may be the skillful buyer who makes a study of getting full value for her money, or she may be the idler who wastes the energy and earning capacity of sales persons by examining mer-

chandise which she has no intention of buying. Nevertheless, the wise sales person recognizes the necessity and the value of giving courteous attention to all who visit her department. She may, if the customer shows sufficient interest, call attention to goods especially advertised or just received, to unusually good values, to advance styles, or to characteristics of the merchandise for sale.

When a decision has been made, the sales person makes out a sales slip. The following are the transactions usually designated in the store system: Pay and take; pay and send; c. o. d.; charge and take; charge and send; goods bought on credit slip; goods bought on a transfer; goods bought on a purchasing order. She attends to having the package delivered, either into the customer's hands with any change or through the vehicle delivery department of the store. At inventory time, she measures, counts, and assists in making a written record of the goods in the department.

Few positions, and those mainly in cloak and suit departments, require persons of more than average height. Persons very much undersized are considered undesirable, because they may lack ability to command attention. Since sales persons must handle merchandise quickly and deftly but without nervousness or haste, the ability to think and act quickly is desirable. Some of the merchants of Minneapolis do not share the opinion generally accepted by dry goods dealers that women should not be employed to sell woolen dress goods, sheetings, linens, and domestics. Modern store conveniences have reduced considerably the strain of handling large bolts of cloth, and the woman's knowledge of household furnishings and sewing has value in making sales in the yard goods departments. For this reason women are being encouraged to enter these departments. Men are universally employed to sell furniture, rugs, carpets, hardware, and other heavy merchandise.

It requires a great amount of nervous energy to meet customers for nine or ten hours a day; hence sales persons should have good health. They should have no defects such as fallen arches, curvature of the spine, or ailments that cause bad breath or are otherwise offensive. Nervous energy and strength should be conserved. The work would cause less fatigue if proper attention were paid to right habits of standing. Low-heeled well-fitted shoes and comfortable corsets contribute materially to right posture. Good eyesight is necessary for matching colors, patterns, weaves, and qualities.

Inconspicuous attire, neatly dressed hair, and well-cared-for hands are coming to be considered essential qualifications. The sales person should have an alert, discriminating mind in order to hold customers' attention until a sale is made. Initiative and the ability to think and reason quickly are essential, as it is often necessary to sub-

stitute merchandise. A good memory for names, faces, and addresses, and for names, numbers, and kinds of stock is important, as are politeness, tact, honesty, kindness, and patience. It is the person who can think and plan for both store and customer who forges ahead.

Opinions vary widely as to the general education that should be required of applicants for positions in salesmanship. It is significant that sales persons and department heads who were interviewed believe that less than an elementary school education is not sufficient; others expressed themselves in favor of two to four years of secondary education. A few heads of departments expressed a desire that applicants might have a college education. One manager said he would hire at once five university graduates, if he could find five such persons interested in merchandising.

It is true that many heads of departments have had only an elementary school course or less, but these are exceptional men and women who educated themselves through attention to and interest in their work, and to some extent through supplementary study.

Constant study of merchandise and methods of selling is necessary, no matter what the preliminary education, for merchandising is a live science and salesmanship both a science and an art.

The buyer is the executive head of one or more departments. He occupies one of the most responsible positions in the store and, as a rule, has been promoted from the selling force of this or some other store. He is a highly trained salesman, who has developed initiative and executive ability. He has a more comprehensive knowledge of merchandise than the people who work under him, and knows the methods of obtaining business. He knows markets, factories, and jobbers. He buys for the store the merchandise sold in his departments. He decides how it shall be arranged and supervises its display.

When the new merchandise arrives in the receiving room, he meets it and, assisted by someone from his department, checks and marks it. The checking is done to see that amounts and kinds ordered have been received and that no substitutions have been made.

He directs the advertising for his department. He writes a description of the goods, trying to make it so vivid that the public will see the merchandise as he sees it. This copy is revised and arranged by the advertising man, and the buyer reads the proofs. He supervises the inventory of his department.

In buying merchandise the buyer must estimate how much he needs of each kind and quality so as not to overstock and thus keep "tied up" money which could be invested in goods to sell at quick profit. He must know how much his store usually sells and must exercise judgment and good sense in buying. A knowledge of trade condi-

tions will help him to make a fairly accurate estimate. It is now the policy of buyers to order every few days, if necessary, rather than to keep a large stock of merchandise on hand. A tendency to overbuy is considered a serious fault, as "turnovers," not "left overs," make a profitable business.

One of his most important duties is setting prices. He must know about how much the public will pay. He must know how to equalize prices; if he makes "a leader" of something by selling it at cost, he must know how to make a profit on something else.

Besides the duties specified, the buyer oversees all the work done in his department. He gives talks on how to care for stock, how to sell, and how to handle customers. He is the judge of the capability of his sales persons and recommends promotions or dismissals. He must be energetic and full of enthusiasm and optimism in order to inspire his assistants with a desire to excel. He must be able to obtain from them the maximum of service with a minimum of friction. If a sales person needs help to make a sale, he must be ready to assist in satisfying the customer's demands. He is the final authority on questions concerning the merchandise in his departments. Although subject to the decision of the owner or general manager in making other than minor changes, the buyer who is of most value is the one who can think out and present to the proper authority for consideration and adoption new labor-saving, money-saving, business-getting plans.

Since the buyer begins his career as a member of the sales force, his qualifications must be those of the sales person and, in addition, a knowledge of the economic conditions relating to his branch of the work. It is impossible to measure the study that may be given to the problems affecting, directly or indirectly, the quality, price, and style of the merchandise of his department.

The growing tendency of college-trained persons to enter merchandising and the favor with which they are received by progressive merchants indicate that merchandising has a content of subject matter and an opportunity for service sufficient to satisfy the desire of educated persons for work which is a service to society as well as a means of earning a livelihood. It also indicates that merchants recognize the value of service rendered in this spirit.

The assistant buyer is a sales person as well, and is in closer touch with the buyer than any other sales person. She helps to estimate the kinds and amounts of merchandise needed and assists in its selection. She informs the buyer of the kinds and qualities of goods which have been popular during the season and tries to increase the amount of business done in the department from year to year. She may have charge of keeping the records of sales.

If the department is large and pays well the firm may send the assistant with the buyer to select goods in the eastern markets. Otherwise, she helps to select merchandise from displays carried by traveling salesmen. In this way she becomes conversant with the duties which she may assume in the future as buyer.

Occupying a position between the buyer and sales persons and performing many of the duties of both, she must be an expert saleswoman and have to some extent the qualifications of the buyer.

MERCHANDISING OCCUPATIONS IN SPECIFIC DEPARTMENTS.

There are general principles of salesmanship which apply to all departments, but a certain specific knowledge of stock and of methods of selling applies to each department. The character and amount of information required depend upon the merchandise carried. It was impossible to make a detailed study of all departments to ascertain the specific knowledge required for each. Exhaustive study of any department is practically impossible because merchandise changes with varying styles, kinds of material, and new methods of manufacture.

To be of much use to persons engaged in selling, study of merchandise must be progressive. The departments dealt with here were studied to show that some information is necessary for efficient salesmanship in every department, no matter how simple the merchandise sold or how little salesmanship apparently is required to dispose of it. The departments reported upon are yard goods, comprising cotton fabrics, woolen fabrics, linens, silks, and mixtures, ribbons, lace and neckwear, handkerchiefs, trimmings, notions, patterns, art goods and art needlework, ready-to-wear suits, coats, dresses, waists, and children's garments, hosiery and knitted underwear, gloves, shoes, stationery, jewelry, and silverware.

The sales person who sells yard goods should be able to measure accurately; to cut, roll, and fold goods; and to display goods to the customer and on the counter. He should be able to calculate in terms of yards the metrical system used on imported silks. He should have specific information about widths, weaves, prices, values, and qualities, including knowledge of textile fibers and mixtures; dyes, finishes, and adulterations, and their effect on fibers; wearing qualities and uses of the various fabrics; where and by whom they are made and the reputation of the makers. He should know simple tests for determining a mixture, the amounts and kinds of fibers used in mixtures, and adulterations and wearing qualities of the goods he sells.

The sales person should have a knowledge of prevailing styles to be able to make suggestions as to the use of materials and the amounts needed for various purposes. He should be able to match and harmonize colors and match weaves; to suggest trimmings and combina-

tions of materials; to advise in regard to the beauty or wearing qualities of fabrics and the satisfaction they have given former customers. It is desirable that sales persons should be able to assist in the planning of garments, and for this reason the employment of women is being encouraged.

In the organization of departments, cotton yard goods may be divided into four classes. These are (1) cottons, which include sheeting, pillow tubing, bleached and unbleached muslin of various kinds, long cloth, nainsook, cambric, crêpe, Indian head, and shrunk cotton; (2) domestics, which include gingham, chambray, calico, percale, tissue, cotton crêpe, madras, flannelette and outing flannel; (3) dress fabrics, which include piqué, corduroy, india linen, dotted swiss, organdie, mull, lawn, dimity, batiste, crêpe, voile, marquisette, and novelties; and (4) linings, which include sateen, cambric, drilling, heatherbloom, canvas, crinoline, percaline, silkoline, and novelty linings made to imitate silk.

Linens are divided into two classes designated as (1) staple linens, which include tablecloths and napkins, towels and toweling, crashes, linen sheeting, pillow tubing, and damask; and (2) fancy linens, which include centerpieces, lunch cloths, doilies, table runners, dresser scarfs, pillow and bolster slips.

Woolen yard goods, as a rule, are sold in one department. Each sales person is responsible for the care of a certain part of the stock, and although he may sell stock in any part of the department, he is expected to give most attention to acquiring knowledge about the stock under his particular care. The stock is arranged by qualities and colors, though cloakings and suitings may be placed according to weight and bulk rather than quality and color.

The sales person should have a thorough knowledge of such staple dress fabrics as serges, broadcloth, cashmere, gabardine, poplin, brilliantine, mohair, albatross, challie, voile, whipcord, bedford cord, and Scotch plaids; of such cloakings and suitings as tweed, covert cloth, melton, cravanette, zibeline, chinchilla, and a variety of novelties; and of the various kinds of flannel.

Silk yard goods also are sold in one department, as a rule, though black silks, satins, and crêpes may be sold separately. Like woolen goods, they are classified as to colors and prices, and each sales person is responsible for a section. Since they sell all the silk fabrics, they should know bengaline, brocade, chiffon, corded silk, taffeta, satin, and the other staples, besides novelties appearing from year to year.

The sales person who sells cotton yard goods should know, in addition to the information already specified, whether the fabrics will shrink, fade, or otherwise deteriorate in laundering, and whether they are of fine or usual grades of cotton. The linen sales person must know the difference between pure linen and a mixed linen-and-cotton fabric and

the differences in Irish, Scotch, and French linens. To sell fancy linens, he should know Madeira work, Cluny lace, Spanish, Mexican, Cuban, and domestic drawn work, and hand-made as well as machine-made embroidery.

The sales person who sells woolen fabrics and the mixtures that pass as woolens should know merino, camel's hair, mohair, and Australian wool. He should know woolens, worsteds, and shoddies, and be able to determine to what extent cotton has been used. He should know whether the cloth was dyed in the yarn or in the piece; the shrinking, spotting qualities of fabrics; and how to shrink or sponge cloth.

The sales person who sells silks should be able to tell those made from the fiber of the silkworm, whether Italian, French, or East Indian, from those made from wood-pulp or vegetable fiber, and know the difference between American and imported fabrics. He must know dyes, colors, weightings and other adulterations used, and whether fabric is linen and silk or cotton and silk. A knowledge of prevailing styles is desirable.

The sales persons in yard-goods departments should have the ability to use their specific information judiciously and helpfully in selling merchandise. They should be strong, as the work involves lifting. Bright, alert, intelligent, and experienced sales persons who have demonstrated their ability to sell are preferred.

The buyer of yard goods must have all the requirements of a competent salesman. He must be a textile expert, and have the ability to teach others. It is essential that he know the various firms that manufacture the same kinds of materials, those that manufacture the different grades and styles, and those that make specialties of certain weaves. He must follow closely the trend of style in colors and weaves and to some extent trimmings, so as to determine their effect on the yard-goods trade. He must know enough about the stock carried by other firms in the town to estimate the amount of competition he will meet. Yard goods are manufactured and contracted for long before they appear on the counter; the successful buyer must analyze the business of his department and estimate the amount, kinds, and colors of fabrics in advance of the selling season. A knowledge of foreign and domestic markets for yard goods is essential.

The sales person who sells ribbons should know silks, but the style and appearance of ribbon are of more importance than its durability. The sales person should know the various uses for moire, taffeta, and satin in the different widths and weights, and should familiarize herself with the patterns, kinds and uses of ribbons for each season. Her value increases in proportion to her ability to manufacture novelties and bows and to suggest to customers how to use the various kinds of ribbons in the department. The sales person must know how to measure accurately, as profits on ribbons are said to be seriously

affected by overallowance in measuring; how to hold the bolt while measuring; and how to roll ribbon and paper on the bolt neatly so as to protect the ribbon from dust and light. She must watch the length of the ribbon as she sells from the bolt, so as to avoid leaving short, unsalable ends which decrease the profits. Remnants also require attention as to care and sale. The sales person is expected to keep them clean and fresh looking and to dispose of them in the shortest possible time.

Good taste, ability to match and harmonize colors, personal neatness and, to some extent, deft hands are required. As ribbons are accessories rather than essentials, their disposal depends largely on the attractiveness with which they are displayed.

The buyer of ribbons must know the stock thoroughly and how to sell ribbons. He must understand the business of buying, know where various grades and kinds are to be bought and, to some extent, where and how they are made. He should be on the lookout for new ways of using ribbon, as much is sold for novelties.

The great variety of ribbons demands minute watch of new styles and kinds. Certain seasons demand certain ribbons; at Christmas time there is a great call for light and fancy ribbons and the holiday colors, and in the summer there is a demand for whites, pinks, and blues in all kinds, as well as lingerie ribbon, hair bows, and girdles.

The sales person who sells lace, although the stock changes constantly because of variations in styles, should have a background of general knowledge about standard and novelty laces. The competent sales person knows the standard laces when she sees them, knows the various meshes and, to a considerable extent, how they are made. She knows the different grades of the same kind and the imitation from the real. She knows linen from cotton, mercerized from cotton, and silk from other fine laces. She should know the durability and washing qualities of each, and their general purposes and uses. She should be able to suggest the lace suitable for different trimmings and the amounts needed. She should find out, without direct question, what purpose the lace is to serve and what price the customer wishes to pay, so as to make suggestions. After the sale is made, she must wind or fold the lace so that it will be delivered in good condition.

Good eyesight for the matching of patterns and meshes is necessary, and good taste in the use and arrangement of lace as trimming. Some knowledge of design is useful and may be an essential factor in selling. A knowledge of lace requires considerable study as to materials used, development of patterns, stitches and meshes.

The buyer of the lace department must know trade conditions in certain foreign countries, because of the effect on laces. He must be

able to judge whether a rare piece of lace has a commercial value in the merchandising business, or whether its worth can be discerned only by the artist. The buyer of laces has an extensive field to study. When a real knowledge of hand-made laces is desired, it means study of the laces, the patterns, the people who make them, the way they are made, and the length of time required. A successful buyer makes such a study of real laces and knows how machine laces are made and their value as compared with those they imitate.

Stock keeping in laces is especially difficult because it is hard to keep narrow laces from stretching, and because if any threads are caught they may pull out. Laces must be kept clean. Short, unsalable ends should not be allowed to accumulate. Edges and insertions should be kept in right proportion to meet the demand for each. Good taste is essential and knowledge of design is a valuable asset, as much depends upon the design and quality of the popular laces which in many stores constitute the largest part of the trade.

The sales person who sells neckwear often finds it necessary to try on the collar or fichu to show the customer how it looks. To do this effectively she should be neat, attractive, and pleasing in manner, for the customer does not realize that the attractiveness of an article depends to some extent upon the same quality in the person wearing it. The saleswoman must know the names of the various articles she handles and must have a sufficient knowledge of textiles to know what kinds of collars may be worn with different materials. For example, if a customer says she has a voile waist, the saleswoman must know instantly what materials may be worn with it. She must know the laundering qualities of the neckwear. She should study fashion magazines and be able to demonstrate to customers new styles of neckwear.

The girl who sells handkerchiefs must have a knowledge of linen, lawn, cotton, mercerized cotton, shamrock, and light silks. She should know the combinations of fibers used and be able to tell from the appearance and feeling just what is the combination in a particular handkerchief. For example, she should know that in certain high-priced handkerchiefs the thread running one way is linen and that running the other shamrock. She should know that this makes a more sheer and a softer-looking handkerchief than pure linen, but is not so durable. She should know that French linens, because of their greater brilliancy, are more desirable than Irish linens. She should know the difference between domestic and foreign goods, between hand and machine embroidering, between punched and pulled hems, between real and Armenian lace, and between either of these and imitations. She should know which colors are fast and which are likely to fade so that she can tell the customer about the care needed in laundering.

Most persons are not in a hurry when buying handkerchiefs, so the girl must have the skill to give many points as to value in beauty and wearing qualities, and to show goods in detail. She should like details and be perfectly familiar with the workmanship on handkerchiefs. The work does not require measuring or estimating fractional parts, so computations are easy.

The buyer of handkerchiefs, in addition to the knowledge possessed by sales persons, should know for what grades, styles and colors, and for what initials, there is greatest demand. He must estimate the demand during the regular or normal selling times as well as during the holiday season when it is greatly increased. The display of handkerchiefs is part of the buyer's work. Since it is desirable that handkerchiefs be clean and fresh looking, display is a problem which may mean loss.

The sales person who sells trimmings should be able to wait on more than one customer at a time because the amounts are small and, as a rule, each customer consumes a great deal of time.

Style is an important factor in trimmings and sales persons should study fashion books and ready-to-wear garments so as to be able to suggest uses to which trimmings may be put. They must learn the texture and weight of fabrics, so as to know the right weights and kinds of trimmings and the correct colors for a fitting combination. A knowledge of color harmony and contrast is necessary. There is such a variety of trimmings that often it is difficult to make a choice, and the sales person is most valuable who can help a customer to make a decision.

Buttons are an important item in trimmings. Appearance rather than durability is desired, but sales persons must know whether buttons will wash or must be removed from washable fabrics before sending to the laundry. For this reason they must know whether buttons are made of shell, vegetable ivory, steel, brass, jet, braid, bone, colored or painted glass or wood, or a combination of materials.

Accuracy in measuring and in computing prices is necessary. Many trimmings are very expensive and inaccuracy might lose all the profits. Sales persons are called upon to estimate quickly how much to charge for two buttons at 75 cents a dozen or five inches of trimming at \$2 a yard. Such problems require especial accuracy in the use of fractions.

The buyer of trimmings, besides having the knowledge required of a sales person, must have considerable knowledge of how trimmings are made. He must know real trimmings and imitations. He must know where trimmings may be bought for the least money; the extent to which the expense of transportation will affect the cost, and whether the difference in style or value will pay for transportation. He must know where staple buttons and where fancy trimming

buttons may be bought. He must know the different materials from which buttons are made, their wearing qualities and their artistic value as trimming.

The sales person who sells notions has many kinds of merchandise to learn. This department carries a larger variety of articles than any other. It is almost impossible to study the processes of manufacture through which all the articles pass, but it is possible to procure information about such things as thread, buttons, pins, needles, and shields. The more sales folk know about the merchandise, the more interesting they find their work, and the information can be used, through suggestion, to increase the amount of sales. For example, if a saleswoman told a customer that steel pins at 15 cents a package were better to use in fine fabrics because the points are smooth, due to the fact that they are pointed in oil, the customer would probably buy the 15-cent package instead of a 5-cent package of blunt-pointed or iron pins.

It is hard to learn the stock of a notions department because of the many kinds and sizes of merchandise. It is necessary that every sales person be careful to fill in the "Want Sheet" as the demand sales for many things are practically constant. The reply "out of stock at present" may lose sales and inconvenience customers. A good memory and readiness in seeing the numbers and other marks on the boxes are necessary.

The buyer of notions has peculiar problems to meet, as he must keep on hand a stock of so many different kinds of articles. He must estimate how much to buy of hundreds of different articles and must know many more factories and jobbers than the ordinary buyer. Less of his buying is done by trips to the East than where style noticeably affects the desirability of the stock, but what his stock lacks in design or attractiveness is made up by the diversity of articles upon which he must be informed.

The sales person who sells patterns learns her stock by numbers. This department is organized somewhat differently from others, being controlled more or less by the company whose patterns are sold. There is usually a head saleswoman, but no buyer in the ordinary sense of the term, as patterns are ordered by numbers and orders sent nearly every day. The saleswomen must know the pattern numbers and where to find the patterns in the books and on the shelves. This is not difficult, as all are pigeonholed and may be readily found. They sell fashion magazines and style books, and sometimes take subscriptions for them. They should have a knowledge of textiles and some knowledge of sewing so as to make helpful suggestions when asked what pattern to use for certain fabrics, what fabric to buy for a certain pattern, and what styles of garments suit slender, stout, short, and tall figures. Customers frequently

take dress goods to the pattern counter and ask for advice. They also ask how to bind seams and what kinds of trimmings to use for the garment they need.

Saleswomen should be versed in the current styles, know what is going out of style and what is coming in, and should study window displays to see the styles of ready-to-wear garments, and use this information in helping customers to choose patterns.

The sales person who sells art goods may be a general sales person in the department or may sell special goods in one of the subdepartments in which art goods frequently are placed, such as art notions, white and colored embroidery, tatting and crochet materials and articles, knit goods and knitting materials, and basketry and beadwork. The sales person may not know how to do all the kinds of fancywork she sells, but her value is measurably increased if she can embroider, crochet, or do beadwork. She is asked to suggest the kinds, colors, and amounts of thread needed for all kinds of work. She should know how to blend, contrast, and harmonize colors; the difference between simple and complicated patterns, and how to suggest changes; and the difference between a good design and a poor one. The ability to draw simple designs is of great assistance.

The sales person should have reliable information about such materials as linens, art crash of cotton or linen, scrim, art canvas, knitting yarns of various kinds, and embroidery threads of silk, linen, cotton, and mercerized cotton.

This department, like that of handkerchiefs, has many casual customers who may be interested by the latest novelties, fabrics, or designs.

The buyer of art goods, in addition to a buyer's qualifications, must know how to do the kinds of fancywork she sells, as she is frequently called upon to give a lesson or practical hints as to how work should be done, how colors should be used, and what stitches will give the best effect. Styles in fancywork, which come and go just as in other lines, are closely watched, and the demand for staple and novelty goods is carefully estimated.

The sales person who sells ready-to-wear clothing must know styles, colors, fabrics, and wearing qualities, and the different types of figures to be fitted. The variations of these factors involved in selling dresses, waists, coats, and suits are too many for detailed treatment here. Ready-to-wear garments are sold for men and women, boys and girls, and infants. They are usually found in separate departments, and, while the same general factors enter into the selling, the variations in garments according to age of wearer call for attention to details. The element of style is so important in selling dresses, waists, coats, and suits that sales persons must be posted

about style tendencies as well as about the stock on hand. A study of the types of figures is becoming important, as manufacturers are meeting with considerable success in their endeavor to make garments for slender, stout, short-waisted, and long-waisted figures.

Line, color, and trimmings, and their suitability for these figures, constitute an important part of the study of style. The conservative and the ultrafashionable need careful consideration by the sales person, as patrons of ready-to-wear garments represent both extremes.

Good taste, which is usually a combination of the qualifications enumerated, good judgment, and a knowledge of fabrics as to wearing qualities, weaves, colors, and textures in their relation to style prove of value in selling garments. Sales persons are not called upon to fit garments for alteration, but the kind and amount of alteration to be made are a part of the selling, since the sales person must be able to suggest changes which may affect the appearance of the garment and the cost as well. The sales person lacking this ability succeeds best in selling garments not altered in the store.

Sales persons who sell infants' wear should be women who like children and have the sympathy, patience, and kindness necessary to fit them. Personal interest is very important, as children may be fretful or sensitive, or may not understand why they must try on garment after garment. As so much depends upon the kind of clothing which babies wear, it is considered most important that saleswomen should know the relative desirability of the various kinds of infants' wear. They are frequently called upon for garments of special styles and materials and to explain their effect upon the child, and the information they give must be accurate. The capable saleswoman gives careful and constant attention to mixtures of textiles, fabrics used, laundering qualities, and variations in size and length.

Young girls and inexperienced sales persons are not employed in ready-to-wear departments, as the work requires strength, mature judgment, knowledge of people, and a knowledge of styles and of merchandise acquired only by experience, study, and close observation. The demand for outer clothing is seasonal. Spring, winter, and summer clothing make varying demands upon the sales force, calling for endurance, initiative, and responsibility rarely acquired under several years of experience.

Popular-priced garments sold on special sale, and standard garments, such as house dresses, kimonos, and aprons, make fewer demands on the sales person's physical strength and knowledge of styles than do dresses, suits, and coats. This line of selling is important, however, in spite of the fact that the appeal of color and personal

adornment is less than that of wearing quality, comfort, and usefulness. Just as the person who sells dresses, suits, and coats must know for what occasions the garments are to be used and the customs and etiquette of those occasions, so she who sells house dresses, kimonos, and aprons should know the use, wearing and washing qualities of these simpler garments.

Buyers of ready-to-wear clothing may buy for several departments or for only one, according to the size of the store and the volume of business done. Buyers of outer clothing study the trend of styles as closely as a bookkeeper watches his accounts. The buyer knows the big and the exclusive garment markets, and those for fabrics and trimmings as well, as the garment industry is affected by any marked change in these other lines. He studies the trade of the department for which he buys, determines the variety and amount of stock it may carry, and looks after the replenishing of the stock from time to time to keep it fresh and up to date. This requires buying for the season in some lines and from week to week in others. He directs the care of the stock and such necessary repair work as sewing on hooks and eyes.

Since ready-to-wear garments have become popular with practically all persons, these departments have increased greatly in importance, and the buyer carries a large responsibility and must have a high degree of business ability and good taste. Both men and women are employed. They go to the eastern markets two or more times a year to select stock and keep in touch with styles.

The sales person who sells undermuslins must know undergarments of many styles and qualities in both cotton and silk fabrics. Underwear frequently is divided into several subdepartments with one buyer in charge. Sales persons may be called on to sell all the kinds and grades, or the stock may be divided among them and each may have charge of one or more lines. As a rule the high-priced "fancy lines" are sold by the more experienced sales persons, who must know hand-made from machine-made embroideries and laces, and the kinds and grades of all the exclusive garments in the department. The sales person should keep herself informed about styles in outer garments, as changes in them, as in corsets, affect noticeably the style of such garments as petticoats, combinations, and corset covers. In this department, as in the selling of outer garments, good taste and attention to details are important.

Buyers of undermuslins keep in touch with markets and styles and take semiannual or more frequent trips to the market centers. A knowledge of market conditions for fabrics and trimmings is necessary to some extent, since shortage or oversupply there means difficulties for the manufacture of garments and ultimately for the store and the consumer. As is true of outer garments, the buyer for this department must carry a large business, keep his stock fresh and

up to date, and show considerable taste and judgment in the choice of novelties as well as staple lines.

The sales person who sells corsets may be a fitter also. After taking the customer's measure she selects from her stock the corset that most nearly meets the requirements. To do this successfully she should have a knowledge not only of the normal but of the stout, the slender, the short-waisted, and the long-waisted figure. As a fitter she should know how to adjust the garment for the sitting as well as the standing position; how to determine whether the bones should be lengthened or shortened; and how much fullness should be added by means of gores, or how much taken out. She knows the fabrics used for corsets, and the kinds and durability of bones. Experience develops ability to judge of these things quickly. Hence, inexperienced saleswomen usually sell only the cheaper corsets, which are not fitted. Many stores employ women specially trained in the methods of manufacturing and the designs of the various models. This important background of knowledge is, to considerable extent, the result of years of cooperation of manufacturers with physicians and nurses who were interested in making a marketable and hygienic garment.

The buyer of corsets is the head fitter and has charge of all buying and fitting. She knows the corsets she sells and the others on the market. She notes the changing styles of outer clothing and the consequent changes in corsets. If a careful student of her work, she knows the human figure and has some knowledge of anatomy. In addition to looking after the demands of customers, replenishing stock, and keeping up with markets and styles, she trains her sales persons to show corsets and to fit them.

The sales person who sells hosiery may sell knitted underwear. Though usually sold in different departments, these goods have many points in common. The same methods of manufacture and the same materials are used to a great extent. The sales person should know sizes, full-fashion, seamless, and outsize hosiery; pure dye silks, thread silk, loaded or plated silk; the various grades of cotton, lisle, mercerized, and wool mixtures, and weights used; and be able to use this knowledge in selling the various kinds of stock. It is desirable that the different kinds of knitting used should be understood. She is frequently called upon to estimate the size the customer needs, especially in children's wear; so should be able to judge from the size of the shoe or the age of the child.

The sales person who sells underwear needs much the same information about the stock, methods of manufacture, and materials used. She should know these details for winter and for summer underwear and be able to give accurate information about the grades in which wool, wool and cotton, and wool and silk mixtures are used. In both these lines of merchandise novelties are introduced from time to

time but they affect the trade much less than novelties in outer garments and undermuslins.

The buyers in these departments seldom go to the distant markets, but buy from traveling salesmen or from samples submitted by the manufacturers.

The sales person who sells gloves should know the leathers and fabrics used, care of gloves, and how to fit all kinds. The knowledge of fabrics should cover silk, cotton, lisle, and chamoisette; that of leathers should cover lamb leathers such as capeskins, mochas, chamois, and dogskins, and kid leathers such as suede.

A saleswoman's interest in her work should be increased by knowing that the softness and durability of glove leather depends on the age of the animal and the place where it was raised; that leather from skins taken from the young of hardy, mountain-climbing sheep is stronger than that from the young of animals which browse in lowlands and on plains, and that the best gloves are made from skins of kids found in the southeastern part of France.

She should know enough about gloves to make the customer understand that care must be exercised in washing a doeskin glove because it is the process of manufacture and not the leather itself which has made it washable. She should know the various parts of a glove; the different stitchings—spear, plain, filet, and three-row; and the different methods of seaming, such as Prix seam, pique, and round seam, and the customary usages and peculiar merits of each. If she understands the manufacture of gloves she can explain the difference in durability, softness, and purpose of each style of glove and can give the customer much acceptable information about their proper care.

A saleswoman must know how to use the stretcher and powder. She must be able to fit gloves and to judge by looking at a woman's hand what size glove to try. She should know the best position for the customer to assume while being fitted and how to stand so as to avoid unnecessary strain of the muscles of the back.

The reshaping of the glove after fitting demands skill. A machine has been invented for this purpose, but it is not used so extensively as to eliminate the hand reshaping of the glove. This must be so skillfully done that the glove will not show that it has been fitted. Mending of gloves is important. A sales person may be trained to look after the mending as part of her work, or it may be done in a special department.

The buyer of gloves should know both foreign and domestic markets, the skins and fabrics used, and their source and methods of manufacture. Style is an important factor, as gloves are made to conform to some extent to the styles for outer garments.

The sales person who sells shoes should be skilled in fitting. This demands a thorough knowledge of many styles and the shapes suited to various types of feet; the lasts, soles, and uppers that are most comfortable, serviceable, or attractive; the difference between hand-turned and welt-sewn shoes; and, to some extent, the anatomy of the normal foot and slight abnormalities. Feet which require specially constructed shoes, arch supports, and insoles are usually fitted by a specialist who has made a study of the anatomy of the foot and the different methods of fitting.

As physical comfort and, to some extent, health depend upon well-fitted and serviceable shoes, the sales person must know his stock and be able to deal tactfully with his customers, some of whom demand style regardless of suitability while others desire comfort and service combined with more conservative style. There is a wealth of detailed information about shoes to which the up-to-date sales person gives attention. The changes in cut, top leathers, and fabrics call for new information each season.

Novelties are almost as much of a problem in the selling of shoes as of coats, dresses, and hats. The greatest skill is demanded for the selling of the more staple lines, for all persons may not be suited with the same model. Tact, patience, and good judgment are essential qualifications.

The buyer of shoes must know leathers, their service-giving qualities, the methods of making shoes and the best ways of fitting them. He must know leather markets, places where shoes of different styles are made and the methods of manufacture, and must watch the changing styles. He does quantity buying, usually from three to six months before the retail season, and buys novelties in advance, or from time to time as the trade justifies it. Hence he must be able to forecast his business months ahead of time. Much information about leathers and shoes may be gained from trade and technical journals and Government reports.

The sales person who sells stationery must know the sizes of papers used for different purposes, such as legal, letter, and note, and how to match paper and envelopes so as to give the same quality, style, and finish. She must know that a quire of paper contains 24 sheets, and a ream 480, so that she may give this information to customers if necessary. She should understand the difference between die-stamped and printed initials or monograms.

In engraving, a complete knowledge of the wording and of the kind and size of card for any invitation is necessary. Some stationery departments keep a book on etiquette at hand for reference, as many people who have invitations engraved do not know how to word them. It is also necessary to know the different kinds of lettering. A sales person should know how paper is manufactured and

the relative amount of linen pulp used in the different qualities. She should be able to test paper to discover whether it contains linen, and to tell at a glance the different finishes. She should know how to present a superior paper in such an attractive way as to win for it customers who otherwise would use a cheap stationery.

Sales persons are required to keep a list of customers who regularly come to the store for engraving, and to keep properly filed plates left in the store for safe keeping and future use. Styles and novelties which affect stationery demand some attention, but in the main the sales person is expected to keep well informed about standard stock and prices.

The buyer of stationery must know all the kinds of paper and the prevailing customs in stationery and engraving, getting his information through trade journals and reports.

Sales persons who sell silverware should learn how each kind is manufactured, of what grade it is, and how well it will wear as compared with others. They must know the different weights of sterling silver, and must know by name and by sight the different patterns in both plated and sterling. In most departments, if a customer can not afford to buy a medium or heavy-weight sterling spoon, she is advised to buy a plated one, because a light-weight sterling spoon will bend and break.

They should know that English Sheffield is made by rolling a thin layer of silver on a copper foundation, and that American is made by plating a copper or nickel base with silver. They should recognize such metal combinations as platinoid and German silver.

Sales persons usually tell customers how to clean silver. To prevent the silver being scratched while in stock it is sometimes covered with a lacquer made of a combination resembling thin gelatin. A customer should be told whether the article purchased is lacquered, because the lacquer peels off in very hot water and she might think she had been cheated. As silverware is used for table service, a knowledge of patterns and the correct silver for various occasions is necessary.

The sales person who sells jewelry should have a knowledge of silver, because much jewelry is made of silver. She must know what is meant by gold-filled, gold-rolled, and gold-front jewelry. She should be able to show interesting things about different pieces of jewelry, as, for example, the desirability of a chain composed of soldered links as compared with one having unsoldered links. She should have accurate knowledge of the materials used in buckles, pins, bracelets, hair ornaments, fancy purses, and beads. Jewelry is a part of dress and so is affected by style, to which the sales person should give attention.

**SELECTION, TRAINING, AND PROMOTION OF WORKERS FOR THE
MERCHANDISING DIVISION.****SELECTION OF WORKERS.**

Any consideration of promotions in store work must include the methods used in selecting workers, the qualifications necessary, the kind of training given after entrance, and the length of time workers remain in the occupation.

Superintendents have had to meet many difficult problems in hiring workers for the sales force. Because of the rapid growth of department stores the demand for experienced sales persons has far exceeded the supply, and as there has been until recently little effort made to train persons it has been difficult to find suitable people. There are, however, many men and women in store work who are earnest, intelligent, and efficient, and an increasingly large number of these are giving study and thought to the science and art of retail selling.

The frequency of sales and the need of large numbers of persons to assist therein have resulted in hiring people who answer "Help wanted" advertisements. These are asked to make out application blanks and the superintendent talks with them a few minutes to get some idea of their intelligence and ability to use English. He takes into account personal appearance, and, because he must have help at once, selects the least objectionable of the applicants and puts them to work. He also keeps on file the applications of more experienced people who have applied during the hours when applicants are received, and, when a vacancy occurs, sends for the one he thinks may fill the place.

The application blanks ask for references and inquire into such things as health, living conditions, education and habits, but there is no time to verify the information nor to make inquiries before the applicant is set to work. As a result, persons with limited mental capacity and insufficient education are often employed. Many are forced into the stores by parents, who take the small earnings so obtained to assist in the support of their large families.

If these young persons are able with any degree of success to take care of an aisle table, where the chief duty is to wrap bundles, they may be hired for other sales or as extra help on Saturdays, and may finally get a permanent position on the selling force. There are to-day numbers of such persons in the stores who are receiving the minimum wage after two or three years of service.

Some employers say that on a fair commission basis such persons do not earn what is paid them, but are an expense because of errors and loss of customers through poor service. It then seems evident that they lack promotional capacity. It is among such as these that the majority of deficiencies are found.

There are many better qualified persons who come and go. They will work during the winter perhaps, but when warm weather approaches they leave to work out of doors or to stay at home. Many are not obliged to work and do so only a few weeks at a time to earn pin money. This large transient element complicates the method of hiring and multiplies the problems of promotion and discipline.

Other classes of persons seek positions in the store—persons who have been employed in other capacities and are out of work, widows who find themselves thrown on their own resources, persons who have worked in other stores in the city or in stores in surrounding villages, boys and girls who have finished the eighth grade, and graduates of high school. This investigation has revealed that these are the persons who in the past decade have worked up in the business.

As stated elsewhere in this report, there are men holding responsible positions who entered business at a very early age with little education. Many of these have studied in the night schools and have gained their information and knowledge by hard work. They unanimously declare themselves in favor of a general education for young people before entering store work.

No plan has yet been worked out for standardizing requirements for entrance into store salesmanship. Conditions have governed the stores. It would be unfair not to call attention to the fact that the public is, to a certain extent, responsible for some of the conditions which exist. Many persons still hold to the idea that it requires but little brains to sell merchandise. Many kindly intentioned men and women bring protégés to the store and ask that positions be given them. They are careful to state that they themselves are good customers and leave the superintendent to infer that if a position is not provided their patronage will cease. Friends and relatives visit with the sales persons, sometimes taking as much as three-quarters of an hour of their time. During this time, which of course belongs to the store, a sales person may have lost enough sales to have increased very materially the amount of her sales for the day.

The social status of store work has risen very much in people's estimation in recent years. This is due partly to the fact that merchants are giving preference to well-educated and intelligent men and women, and to younger persons as well, and partly to the fact that the public is coming to realize what progressive merchants have long known, that salesmanship is a science and an art which can be acquired only through study and experience. As requirements are systematized and standardized through a system of preparatory training, supplemented by instruction or study after entering employment, a greater number of persons with real capacity for promotion will be attracted to the work.

PROMOTION OF WORKERS.

Naturally, a person entering any business or profession is interested in knowing the chances of promotion and what he must be or do to be promoted. On the other hand, if employers are to be expected to promote workers they have a right to demand that persons asking for promotion shall deserve it. Many store employees are dissatisfied because they receive a small wage. When some of these were asked what they had done to deserve promotion, they replied: "Nothing," or "I've tried to do my best every day." When asked if they were aware of deficiencies or were doing their work as well as it could be done, they hesitated, did not answer at all, or said, "I suppose we all have deficiencies."

A few of the brightest and most progressive gave quickly and intelligently such answers as: "I need to know stock better"; "I couldn't be a buyer because I couldn't train others"; "I lack confidence"; "I lack experience in serving customers"; "I lack knowledge of values"; "I can't talk well enough"; "I do not use English well"; "I do not always handle customers in the right way." A young woman who had had two years in high school and two in normal school said that she had not enough education.

One naively remarked: "I do not think I have any deficiencies, because I was asked to become head sales person in my department, but declined because I thought I was too young." Another replied: "I consider myself thoroughly competent."

These last two replies seem to show lack of ability to analyze one's self. The first replies quoted show that the persons recognized at least one deficiency, but when asked what they were doing to remedy the deficiency they said "Nothing" or made no reply.

The heads of departments who were asked the deficiencies of those working under their direction gave these replies: "They are indifferent to the store, to customers, and to themselves"; "They fail to grasp the idea of service in merchandising"; "They visit too much with each other, with friends who come in, and over the telephone"; "They are self-satisfied and lack initiative and originality"; and "They will not take responsibility."

Other replies were: "They lack knowledge of stock and do not keep stock properly"; "They lack accuracy in the use of arithmetic and English, and their language is crude and full of slang"; "They can't judge people"; "They lack self-control and self-confidence"; "They are working only for spending money and have no feeling of permanency for their work"; "They lack decision and ambition"; "They work by the clock"; "They work for pay only"; "They do not show merchandise enough"; "They can not substitute merchandise"; "They do not dress properly"; "They do not think"; and "They do not remember."

Indifference, lack of knowledge of stock and of stock keeping, and visiting were mentioned most often in these replies.

Since all authorities on salesmanship agree that the successful sales person is one in whom the physical, mental, moral, and spiritual qualities are developed harmoniously to a high degree, it seems reasonable to conclude that a person who shows one or more of the deficiencies mentioned is unfitted for promotion, and if showing no improvement after instruction and discipline, should leave the merchandising business to seek employment where a highly developed personality is not a requisite.

Necessary qualifications for promotion as given by department heads are good salesmanship, knowledge of stock, knowledge of people, appearance, interest in work, agreeableness, length of satisfactory service, initiative, ability to take responsibility, good memory, promptness, obedience, and general information.

Good salesmanship, knowledge of stock and knowledge of people were emphasized in these replies, indicating that the heads of departments agree with the authorities referred to. Further evidence of this is found in the qualifications for sales persons, compiled from answers to questions given elsewhere in this report.

No regular schedule of promotion has been worked out and put into operation, though promotion by increase of salary and change of position does take place. Messengers become stock keepers, stock keepers become sales persons, sales persons become assistant buyers, and assistant buyers become buyers or heads of departments. In some departments this line of promotion is quite regularly adhered to, but often there is no vacancy to which promotion may be made. The promotion, if made at all, must then be by increase of salary or by transfer to another department.

On the other hand, a person may be an excellent salesman and deserve promotion, but he may lack the executive ability and power to assume responsibility or the judgment of values necessary for a buyer. Where, then, is the new buyer to be obtained, and to what position is the deserving sales person to be promoted? New buyers often are obtained from other stores in the same or another city, but to the manager who is interested in his sales force this is not an ideal method. He desires to promote from among persons who have already given the store their efficient service.

Since such emergencies arise in every store, it seems wise to study the departments to see whether there exists in them a content of knowledge which will enable a person in one to be transferred to another without too much loss of time and energy to make it worth while to all concerned. It is one of the objects of this report to suggest a system of interdepartmental promotion. Such promotion is made now to some extent, but the stores have not yet organized and

systematized it. It is the purpose of this report not to exploit promotion, but to show that if systematic training is to be attempted by the schools and stores promotion must be considered in order to make the training seem worth while to persons with promotional capacity.

In every store there are several departments which are unrelated. So far as knowledge of merchandise is concerned, if a person left one of these and entered another he would carry with him no knowledge except that of salesmanship which would be of any use to him. It seems wise, therefore, in trying to make suggestions for inter-departmental promotions, to eliminate from consideration the following departments: Gloves, shoes, rubbers, hardware, china, cut glass and crockery, pictures, musical instruments, wall paper, rugs, furniture, sewing machines, books, stationery, trunks and suit cases, toys and dolls, kodaks, optical goods, hair goods, drugs and toilet articles, groceries, delicatessen and meats.

The regular lines of promotion in the foregoing departments have been indicated. A person may enter as a stock keeper and by merit become a sales person, assistant buyer, or buyer. If after learning one kind of work he desires to take up another offering greater opportunity he may do so on his own responsibility, but it is not the purpose of this report to suggest that the store try to work out any line of promotion between such departments.

The departments which remain for discussion are: Yard goods, including velvets, woolens, cottons, linens, linings, laces, embroideries, veilings, and ribbons, women's and children's furnishing, including corsets, muslin underwear, petticoats, waists, kimonos, aprons, dresses, suits, cloaks, hats, knit underwear, hosiery, neckwear, gloves, furs, hats; infants' wear; boys' furnishings; men's furnishings; and such departments as trimmings, notions, patterns, art goods, and art needlework.

To be successful as a sales person in any one of these, some knowledge of textiles, more or less specific according to the department, is necessary. It is suggested, therefore, that a person who expects to enter one of these departments be given a general course in textiles, either before he begins work in the store or immediately after. If he had this knowledge he could be moved from one department to another in some such sequence as is indicated in the following paragraphs.

Since many managers try out new employees in the notions department, several lines of promotion are suggested with that department as an entering place. No attempt is made to indicate how long a person should stay in any one position, but it is suggested that new workers be given help and encouraged to work for the next step in promotion. If this plan should be adopted, and adapted to meet the needs of the individual store, it might help to solve the problem

of hiring capable persons in the beginning and keeping such persons after they are hired.

The suggestions made are tentative, but they represent the ideas which the survey has gathered as to the best way in which a system of interdepartmental promotion may be organized and carried out. These suggestions have nothing to do with promotions of employees within departments, as practically all the stores already take care of that; but they are an attempt to indicate ways in which superior merit and ability may be recognized by promotion from one department to another.

Such a plan will open opportunities for advancement in another department to those who might wait years for recognition in their own, and it will open opportunities in another line to those who have reached the limit of their ability in one.

The suggestions are offered with the hope that they may lead on the part of the stores to a careful analysis of the work of related departments and their possibilities as stepping-stones in an orderly system of advancing and encouraging workers.

The scheme of promotion suggested here presupposes a progressive study of merchandise and methods of selling. Such study is necessary for increased efficiency where promotion is within the department, and it is unquestionably necessary where the promotion is to an allied department, for only a limited amount of such knowledge carries over into the new work. Where promotion is to a department in which the merchandise is very different, instruction should be given in advance of promotion or immediately after. Among the departments for which such training is very necessary are linen, silk, and wool yard goods; household decorations; fine lingerie; waists and dresses; coats, skirts, and suits; shoes and corsets.

SUGGESTIONS FOR PROMOTION OF DEPARTMENT-STORE WORKERS.

A. Promotion which takes into consideration good salesmanship, knowledge of stock, knowledge of people, and the personal qualifications which make for success may come by means of:

1. Greater responsibility delegated to the worker, by which he may learn through study and observation that particular part of the business in which he is placed and develop the initiative needed for success. This may not bring an immediate increase in salary, but gives promise of it for the future.

2. An increase in wages in recognition of good service without appreciable difference in responsibility except through the increased sales and better service which should come of experience.

3. An increase in both responsibility and salary for service in the making of sales, care of stock, and learning new merchandise.

Promotions may be made through the following channels:

a. By promotion within a department as already considered. Such promotion is practiced in every store.

b. By promotion from one allied department to another; that is, to a department where some knowledge of merchandise and methods of selling carries over into the new work; as, for example, from the shirt-waist to the dress department.

c. By promotion from one department to another, not allied, where the required knowledge of merchandise and methods of selling is noticeably different, and where the information carried over is not extensive nor of a very definite character.

All promotions call for increased effort, closer attention to details, and interest in the new line of merchandise, but those designated under clauses b and c require study of the new phases that enter into the work. Stock numbers, qualities, colors, and methods of use of the merchandise in the new department should be studied, the amount of study varying with the character of the merchandise and the special methods of selling it.

B. Promotions suggested in the following sections take into consideration those through usual channels, outlined in division A.

I. A girl may begin her work as stock keeper in any department and, if she is successful in this and shows interest in and ability for salesmanship, she may be promoted to the position of sales person in the department for which she has been stock keeper.

II. A girl may begin her work as stock keeper in the notions department. If she is successful in this and shows ability for salesmanship, she may be promoted to the position of sales person in the same department. From that position, if promotion to another department is desirable, her experience should enable her to be advanced to any one of the following positions:

1. Sales person in the lace department, which offers opportunity for advancement to the girl with business ability and artistic talent. It is a business in itself to know laces, how they are made, their use, and their value.

2. Sales person in the drapery department. This opens up attractive possibilities for the girl who will study fabrics, their value and their use, as this is one of a number of allied departments known as interior decorating. Study of household decoration and design and the development of good taste may lead to desirable positions.

3. Sales person in the ribbon department, and from there to the silk department, where the opportunities for advancement in salary and the development of business ability and artistic talent are great.

4. Sales person in the trimming department.

5. Sales person in the leather-goods department.

6. Sales person in the jewelry and silverware department.

7. From any one of these positions as sales person the girl may be promoted to the position of assistant buyer, and from that to the position of buyer, if she can qualify. This does not mean that all the departments must be "sampled" before the worker chooses the one in which she desires to specialize or qualify for the higher positions. Such specialization may be made in any department, in which case further change would cease.

III. The line of promotion in ready-to-wear departments may be well defined. In the opinion of a number of persons experienced in selling ready-to-wear garments it is very desirable that girls who wish to qualify as sales persons in the waist, dress, or coat and suit department, should learn the business of outfitting. This can best be done by serving in departments which carry aprons, muslin underwear, petticoats, and kimonos, and advancing, as they qualify, to the selling of corsets, waists, dresses, coats, and suits.

A girl may begin as stock keeper of aprons, muslin underwear, petticoats, kimonos, house dresses, or cheaper shirt waists. If she is successful in this, she may be promoted to the position of sales person in the same department. From that position, if promotion to another department seems desirable, her experience should enable her to be advanced to any one of the following positions:¹

1. Sales person in the coat and suit department, and from that to the position of sales person in the dress or corset department. Many specialize in corsets without having sold other garments. Some heads of departments think a knowledge of corsets and their fitting helps the person who sells suits or dresses to understand the figure and the problems of fitting a garment.

2. Sales person in the muslin-underwear department, and from that to the position of learner in the corset department. As corset fitting requires considerable knowledge of the human figure and its variations, many sales persons become specialists. As corset styles vary to some extent as the styles for outer clothing change, experience as a corset sales person is considered valuable preparation for positions in the dress and the coat and suit departments.

IV. A girl may begin as stock keeper in the hosiery department and be promoted to the position of sales person. From there if promotion to another department seems desirable, her experience should enable her to become a sales person of knitted or the cheaper grades of muslin underwear, and from that to positions in other ready-to-wear departments in some such order as indicated in the line of promotion treated under II.

¹ It is the policy of some stores to engage boys as stock keepers in the coat and suit department. These boys do not often become sales persons in these departments, but are frequently promoted to positions in the office or delivery department.

V. A girl may begin as stock keeper in the glove department and be promoted to the position of sales person and receive one or more promotions as described under A.

VI. A girl may begin as stock keeper in the stationery department, promoted to the position of sales person, and receive one or more promotions as described under A.

VII. A young woman may begin as stock keeper in the silverware department and be promoted to the position of sales person in the jewelry and silverware department.

VIII. In the departments enumerated under V, VI, and VII sales persons may be promoted to the positions of assistant buyer and buyer if they can qualify.

IX. Training for and experience in salesmanship and promotion to higher positions are gained most satisfactorily in departments in which the work calls for the greatest amount of detailed information, such as sizes, kinds, stock numbers, colors, styles, grades, variations in use, etc. The notions department has long been recognized as furnishing a wealth of detail that trains the memory, assists in quick visualization, and trains in classification and arrangement of stock.

Some merchants value the shoe department as giving a variety of training to young men entering store work. A boy may enter store work as stock keeper in the shoe department and be promoted to the position of sales person. From this position, if promotion to another department seems desirable, he may be promoted to either of the following positions:

1. Salesman in the men's furnishings department.
2. Salesman in the household furnishings department.

X. A boy may begin as stock keeper in the men's furnishings department, be promoted to the position of sales person, and from selling gloves, cravats, or notions may be promoted to the men's clothing department.

XI. A boy or girl may begin as stock keeper in the cotton yard-goods department, be promoted to the position of sales person, and receive one or more promotions as described under A. From the position of sales person in cotton goods he may be promoted to the position of sales person in:

1. The linen department, if sufficient preparation has been made in the study of linen fabrics, a knowledge of which is essential, and the methods used in selling.
2. The woolen yard-goods department, if sufficient preparation has been made in the study of woolen fabrics and methods used in selling.
3. The silk department, if sufficient preparation has been made in the study of silk fabrics and methods used in selling.

Salesmanship in these departments calls for serious preparation and constant study and observation throughout the entire period of employment, which in most cases lasts for many years. It is for this group, with others, that the advanced courses of instruction are suggested which appear in Appendix D of this report.

TRAINING OF WORKERS.

For several years one large department store has had education in work for its junior employees and clubs for experienced sales persons and buyers. Instruction in arithmetic, spelling, writing, English, the use of the store's system of sales, charge, exchange and transfer slips or reports, and salesmanship, is given regularly to groups of employees. This school has graduated 10 pupils and at present has enrolled in regular classes 231. The club work is conducted by buyers, heads of departments, and members of the firm who meet periodically to discuss the problems that bear directly or indirectly upon their work or their departments.

This school has not been in existence long enough to have affected the question of promotion for all employees, but it has shown that education and training increase interest in the work and earning capacity, which must eventually affect promotion.

Other stores have educational work of somewhat different order. Instruction is usually given by directors, or educational directors meet groups of employees from time to time to give talks on the theory of salesmanship, ways of improving selling ability, or increasing sales, care of stock, and health and hygiene.

Many business men have shown deep interest in this training, and since the work of the survey began two large stores have employed directors to organize classes and give instruction to the employees.

Growing out of the work of the survey, the first part-time class in salesmanship in Minneapolis was organized in September, 1915. Fifteen young women from three of the large department stores were enrolled for regular part-time instruction in salesmanship, textile study, art, arithmetic, and English. These attend classes in the Girls' Vocational High School four half days a week and receive their regular wage without reduction for the time spent in school. The improvement shown in selling ability, in attitude toward their work, in meeting customers, and in greater interest in the art of selling is carefully noted and recorded. The success thus far promises well for the establishment of more such classes, and, it is hoped, for the development of greater interest in salesmanship training among regular high school pupils.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS AND RECOMMENDATIONS OF SURVEY COMMITTEE.

1. Analysis of the knowledge necessary for successful salesmanship shows that there is a definite teachable content in retail salesmanship.

2. Less than an elementary school education is not enough for store work, and a high school education is desirable.

3. Preliminary training to test educational qualifications, interest in and talent for salesmanship is desirable in selecting workers.

4. Preparatory courses and training for retail salesmanship in the Girls' Vocational High School and in the last two years of the four-year course of the regular high school are also desirable.

5. Training in salesmanship, to be of value, must be both general and specific.

(a) General training in salesmanship will apply in all merchandising.

(b) Specific training must be given for successful salesmanship in a specific department or group of departments.

6. Training applies to all persons connected with the merchandising departments of the store, but one type of instruction and the same methods of instruction can not be made to apply to all classes of workers.

7. Training for salesmanship looking toward promotion to responsible positions must be a continuous process (not necessarily daily instruction) covering a period of years.

8. General or preparatory courses in salesmanship may be given in schools, provided such training be supplemented with practical experience in stores during the latter part of the course.

9. Courses in salesmanship dealing with specific kinds of merchandise can be taught most effectively in the store, where theory and practice can be closely related.

The following recommendations based on the findings and conclusions of this report are made:

1. That courses of training be established such as shall—

(a) Test the general ability and the attitude toward and talent for salesmanship.

(b) Train for both selling and buying positions.

2. That courses established be made to meet requirements of—

(a) Beginners such as aisle girls, stock keepers, messengers, and other young persons who have the equivalent of elementary education and who hope to become sales persons.

(b) Sales persons in special departments.

(c) High school pupils desiring to become sales persons.

3. That courses be established in public schools and the stores, as follows:

(a) Preparatory or beginning courses in the Girls' Vocational High School and in the last two years of the regular high school course.

(b) Advanced courses in the stores for experienced sales persons, assistant buyers, and buyers.

4. That teachers of salesmanship in the Girls' Vocational High School, in the regular high schools, and in the stores should be experienced sales persons who have demonstrated their ability to teach; and that educational directors in the stores should be persons having a high-grade selling ability, a talent for and ability to teach, and the necessary executive ability to follow up the students in their work in the store so as to make training an important factor in promotion.

5. That courses in salesmanship can be kept more live and progressive if teachers in charge of such classes are required as part of their regular school work to visit the stores, confer with buyers and sales persons frequently, and serve as sales persons for a short time in the school year.

6. That the courses in salesmanship given by the schools be offered both in all-day classes for beginners and in part-time classes for promising employees whenever the stores are willing to give time off to such persons for further instruction.

7. That the courses of instruction for the different groups of sales persons be taken from some such list of topics as is suggested for salesmanship courses in Appendix C, and which has been approved by the department stores of Minneapolis.

CHAPTER XVIII.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR NON-COMMISSIONED OFFICERS OF INDUSTRY?

In the study of training for leadership in industry a great many concerns were visited. Conferences were held with general managers and their assistants, superintendents and their assistants, and general and department foremen, with men filling various subordinate offices, and with the ordinary workers of the plant.

Information was obtained partly by first-hand observation, partly by direct questioning, and partly in the course of conversation. In addition, each investigator who made a special study of a trade or occupation obtained information about the positions above that of the ordinary worker. Much of this is given in the chapters of this report bearing on such trades and occupations and some is presented here. The study was greatly aided by conferences with groups of employers, of employees, and of employers and employees combined, at which the subject of this chapter was discussed in a general way.

Three groups of persons do the work of the industries of any city. At one end of the business are the ordinary workers, such as the machinist, the printer, and the carpenter, who, in general, do the manual work in the making of the product. At the other end are the leaders holding the important directive positions, such as the manager, the head engineer, and the head chemist, who, while they have found their way by many different roads to the places they hold, frequently and to an increasing degree have been trained in technical schools, and, with little or no experience in the ranks, are soon placed in responsible positions. Midway between these two groups are the men who fill positions secondary and subordinate to those just described but nevertheless of much importance. The field for this intermediate class of workers has widened very rapidly during the past decade. In a general way these workers are the assistants to the engineers, the supervisors of skilled labor, or the specialists in one or another operation that needs knowledge or training in excess of that ordinarily possessed by the skilled worker.

The first group of ordinary workmen is considered in the chapters of this report bearing on the different trades and occupations. The second and third groups may be called, for the sake of clearness in discussion, the "commissioned and noncommissioned officers

of industry." As far as technical education is concerned, the needs of the commissioned officer or high-grade technical leader of industry are well provided for by courses in the engineering college of the University of Minnesota, in Minneapolis, and numerous engineering schools throughout the country. This report is primarily concerned with the third group, the noncommissioned officers, who carry out the plans and orders of the commissioned officers and direct the work of the wage earners.

There is a strong analogy between the organization of industry and that of the Regular Army. In the ranks are the privates who operate the weapons—the mechanism of warfare. At the top are the commissioned officers, including all ranking as second lieutenant and above. These are trained at the technical school of the Army and enter the service as ranking officers. Below them are the noncommissioned officers, the corporals, sergeants, etc., who usually begin as privates and work their way up. The great value of these officers is now being recognized, and special courses in the Regular Army and at the encampments of the militia of the various States are offered to prepare them for their present duties and for promotion, and in special cases for entrance into the ranks of the commissioned officers. Of course, industry is not organized on the military system, and the way of advancement to the highest positions is much more open to workers of every level who have ability and ambition; but the analogy helps to make clear the distinction between the two kinds of responsible positions in industrial life.

A good illustration of the difference between the commissioned and noncommissioned officer of industry is furnished by the street railway. Here technical leadership is found in the engineer of power and his assistant and the engineer of maintenance of way and his staff. All these are graduates of engineering schools who followed a brief apprenticeship course in which they were shifted from one department to another so as to make them familiar in a somewhat superficial way with the work of each. They were then promoted to positions of responsibility and became commissioned officers of industry.

On the other hand, the operating engineers and their assistants who are in charge of power plants usually have come up through the ranks. They may have served as oilers and dynamo tenders and have done outside work on lines. As a result of long experience, careful observation, and study, usually with correspondence schools, these men gained the technical and practical knowledge which brought promotion. These positions, while of the noncommissioned officer type, approach in importance those of the commissioned officer. Indeed, in smaller plants these types merge and the positions are open

to either technically or practically trained men. Below these positions are others such as assistant engineer and boiler-room foreman which are more easily defined as filled by the noncommissioned officers.

Noncommissioned officers are among the most important factors in efficient management or production, and their proper training is one of the most important parts of the movement for industrial education, particularly as provision already has been made for the education of the technical expert. As one chief engineer put it to the survey: "They save us from the mistakes we technical men only too frequently make, since they alone have a knowledge of the very rudiments of their department of the industry that can be acquired only by a man who has been brought right up through the ranks."

All authorities are agreed that the great industrial development of Germany during the past decade has been due in large measure to the excellent training with which the intermediate technical schools of Germany have equipped the capable workingman for leadership in the industrial life of the Empire. England, after a careful study of the causes of the economic rise of Germany, is undertaking through evening classes and secondary technical schools to supply men equally capable for the business and directive side of her industries. While such private institutions as Pratt, Drexel, Carnegie, Lewis, and Ohio Mechanics' Institutes, Cooper Union, the Mechanics' Institute of New York, and others no less noteworthy, have for many years performed a great service in educating men for positions of responsibility, it is only lately that there has come to this country a true appreciation of the need of such training on a large scale.

No hard and fast classification of positions into those of commissioned and noncommissioned officers can be made. The difference is partly in authority, partly in responsibility, partly in salary, and partly in technical knowledge and practical experience required. It would be difficult, even in rough classification, to give a complete list of the various positions that would come under the head of noncommissioned officer, inasmuch as they vary so greatly among industries and among plants in the same industry.

As any industry becomes better organized, the demand for competent men for new positions required by a rising standard of efficiency steadily increases. The cost accountant, cash estimate man, supervisor, inspector, tester, production engineer, line-study man, and efficiency man are a direct result of the introduction of better methods into the work of the shop.

The total number of persons employed in all these positions of intermediate grade can not be given, as no accurate classification and census has ever been made in Minneapolis. Nor was such a tabulation at-

tempted by the survey. This matters but little, if at all, since training for these positions in the diversified manufacturing life of the city can probably best be given through general courses such as cost estimating, shop mathematics, plan reading, mechanical drawing, principles of accounting and business economics—courses meeting the needs of persons in various industries rather than separate courses for the noncommissioned officers of each.

It was felt that a rough estimate showing the extent of the general field would meet the needs of this report. It seems clear that most, at least, of the following persons as reported by the United States Census of 1910, Volume IV, should be regarded as "non-commissioned officers of industry," as the term is used here.

TABLE 19.—NONCOMMISSIONED OFFICERS OF INDUSTRY IN MINNEAPOLIS.

These figures compiled from the U. S. Census of 1910, Vol. IV, show only approximately the number of persons who may be regarded as "noncommissioned officers of industry."]

Occupation.	Male.	Female.	Total.
Foreman and overseers of manufacturing and mechanical industries.....	852	128	980
Electrical engineers.....	817	2	819
Mechanical engineers.....	110	.....	110
Managers and superintendents.....	739	11	750
Inspectors, gaugers, and samplers.....	133	12	145
Sales agents.....	140	15	155
Foremen and overseers of railway transportation.....	289	.....	289
Foremen and overseers of road and street transportation.....	66	.....	66
Foremen, telegraph and telephone companies.....	36	9	45
Civil engineers and surveyors.....	296	.....	296
Mining engineers.....	33	.....	33
Designers.....	34	.....	34
Draftsmen.....	257	4	261
Foremen and overseers—lumber.....	20	.....	20
Foremen, overseers, and inspectors—mining.....	9	.....	9
Total.....	3,831	181	4,012

The salaries of these noncommissioned officers of industry will fall, from the study made by the survey, almost entirely between \$75 and \$200 a month. Probably 75 per cent receive from \$75 to \$100, about 20 per cent from \$100 to \$150, and the remainder from \$150 to \$200. Most of them are in line of promotion to better paying positions, and many in the top-salary group have before them places paying from \$200 to \$500, though in most cases they lack the technical and business ability such positions require.

The positions of these intermediate officers were gained in various ways. In most cases promotion was due to long and faithful service, where the element of chance figured as a direct result of the almost entire absence of a system of hiring and retaining men.

A good example of this type was a man interviewed by the survey who at 55 years of age receives \$100 a month as foreman over 20 men in a manufacturing establishment. His position was obtained after 15 years of service as a workman in the same department with the same concern, and the promotion was due to such service and his fair

knowledge of the practical end of the work. He had had little schooling and making out time cards and shop orders was not easy. He stated that there was no position ahead of his for which a man could make preparation; that promotion was "a matter of pull, anyway," and that he did not see the value of training for his or any other department, as "anyone could learn to do any job in it in a few hours."

A second class of these men, very small in number, is made up of those who, going in at the bottom without much education, made a determined effort to advance. Having analyzed the obstacles to be overcome, they made a study of their work and the demands of positions above them, and gained by personal study the preparation which enabled them to meet opportunities for advancement.

A good example of this type is a man who is now general foreman, at \$2,700 a year, over about half of the concern which employs the department foreman just described. This man made a study of each job in which he was employed and of jobs in other departments with which he came in contact. He "studied up" through books and other outside sources and became familiar with new methods. When acetylene and then thermite welding came out, he introduced and perfected the process for his plant. Initiative and eagerness to gain information have been the moving causes of his success.

A third class of these intermediate officers started at the bottom, but advanced rapidly, largely because, in addition to native ability, they took special instruction in correspondence or evening schools—usually the former, since evening classes for industrial workers are of recent growth. A good example of this class is a young man who has been promoted to a foremanship after only three years in a department which he entered knowing nothing of the work. Realizing his need and opportunities, he took a technical course by correspondence and for one whole year gave every night to study. Recently he has been placed in charge of another department at a larger salary, and is apparently well on his way to other important positions.

A fourth class, smaller in number, consists of those who made thorough preparation along technical and engineering lines in some institution before entering industry. These men usually had a brief apprenticeship course in the actual work of the concern, being shifted rapidly from one position and department to another so as to get a superficial familiarity with the work. After this they were promoted up the line on the technical or business and directive side. From their ranks, as has been pointed out, come finally the technical leaders or commissioned officers. While there is a small but growing number of these in most of the large manufacturing lines of the city, the greatest number is found in the numerous concerns where electricity is made or used, or where electrical appliances are manufactured.

Technical training is absolutely necessary for most of the responsible positions in these fields.

A fifth class of noncommissioned officers consists of young men with high school education who gained from the four-year manual training course an elementary knowledge of tools, materials, machinery, processes and workmanship, and an ability to read blue prints and make simple drawings. While Minneapolis employers, practically without exception, believe the present manual course does not give an adequate start, a considerable number of these young men have in the past 10 years gone into industry on the business and directive side and now hold good positions.

SUMMARY OF CONSTRUCTIVE ACTIVITIES OF THE SURVEY, AND CONCLUSIONS OF SURVEY COMMITTEE.

Five ways of developing the noncommissioned officer of industry in the future seem open to Minneapolis. •

As a result of the survey, industrial promotion courses approved by the trades for the men already employed in the different lines who seek greater efficiency and better positions will be offered in part-time and evening classes at the Dunwoody Institute. Through them most men already employed and seeking advancement will find probably their best opportunity to get specific technical information bearing on different trades and occupations in which they are engaged. In this way one avenue of training for promotion will be opened.

In addition to classes designed for the special trades, the courses of instruction in plan reading, estimating, and interpretation of specifications for the building trades, machine and architectural drawing, and applied design will also be of particular value.

Evening classes for the more capable and well-equipped man are now offered by the General Extension Division of the University of Minnesota in the College of Engineering. The prospectus issued by the division for these classes says that they are designed to furnish instruction to meet the growing demand for men specially equipped for engineering work. These courses, arranged in either two-year or three-year periods, are particularly adapted to the needs of men working in shops and other industrial and manufacturing establishments, to the end that such men may have added to their practical training a technical and theoretical knowledge that will enable them to advance more rapidly in their chosen line of work.

General courses for those seeking advancement, more elementary and less diversified in character, are given by the Y. M. C. A. evening classes.

The boys who have taken the two-year courses in the day school of the Dunwoody Institute will also furnish a source of supply for the intermediate positions in industry. In these courses they will get, in

addition to a good general education, two years' experience in some one of the trades taught in the school, while at the same time they will receive technical instruction bearing on their chosen trade. Equipped with this preparation, these boys will enter the trade as advanced apprentices, with the advantage over ordinary apprentices of having had careful training in the theory as well as the practice of trade processes. Advancement to positions of responsibility for some of these boys at least will be certain to come through sheer force of their better preparation and power of growth.

Technical courses in the regular high schools have, in the opinion of the business men of the city, long been needed to equip young men who are not going to college for entrance into industry as future noncommissioned officers. During the survey a special committee on technical education was appointed by the board of directors of the Civic and Commerce Association for further consideration of a proposed technical course for the high schools of Minneapolis and a plan for cooperation between the industries and the schools in training and placing the students of the technical course, which the board of directors unanimously approved. This committee unanimously approved the plan and appeared before the board of education to advocate its adoption. When the matter was presented to the board the plan was approved and ordered carried out. This plan is given in Chapter XXIII, page 528.

The engineering college of the University of Minnesota, located in Minneapolis, and other similar schools will continue to prepare, in response to a growing demand, an increasing number of young men for rapid rise through subordinate positions to technical leadership and large executive responsibility.

Training in business and commercial subjects also has proved of value to industrial workers seeking higher positions.

As has been pointed out, the experience of all agencies giving evening instruction to industrial workers shows that a surprising number of men of this class come to evening school to get training in business and commercial subjects. Opportunities of this kind are found in courses offered in the evening classes of the General Extension Division of the University of Minnesota. Similar courses, more elementary in character, are offered by the Y. M. C. A.

The question of promotional classes for women needs separate consideration; all the foregoing recommendations deal with men only. While the number of men in positions of leadership to-day far exceeds the number of women, there is every evidence that the latter are to an increasing degree advancing into positions of larger responsibility in industry as well as in commerce. Every consideration requires that adequate facilities be provided whereby girls and women may have a chance, in the lines where opportunities are

opening up, to fit themselves for more important positions. What follows is an attempt to indicate some of the facilities which are or may be provided for them.

The Girls' Vocational High School will send out into dressmaking, millinery, garment making, and salesmanship girls who, because of the special preparation they have received, will be able, other things being equal, to rise rapidly in these lines. In the selection and training of these girls there should be a clear recognition of the large opportunity which the school has of supplying these trades where women predominate with their future supervisors and forewomen.

There are already employed in these lines many capable women who lack only business and technical instruction to meet the demands of better positions. The Girls' Vocational High School should establish evening classes to meet the requirements of groups of ambitious women from these trades who come asking for help in meeting a common need.

The regular high schools of the city have, through their four-year commercial courses, an opportunity to send out into the business world promising girls who, because of their better preparation and larger ability, are equipped to meet the demands of the better positions in the modern office.

Equal opportunity with men should be afforded to women in all industrial promotion evening classes for the occupations where both are found, and general evening classes in all such subjects as advertising, salesmanship, and principles of accounting should be open to them upon the same terms with men.

CHAPTER XIX.

WHAT ART EDUCATION IS NEEDED IN INDUSTRY?

The findings in this chapter have been approved by representatives from the trades studied. The recommendations were prepared by a special committee on the place of art in industry, whose membership is given in Appendix A.

During the survey, conferences were held with representatives of practically every line of manufacturing wherein the appearance of the product is an important factor in its value. Opinions of proprietors and managers were gathered as to just what art training is needed by persons in different industries in order that they may be more efficient and their work more artistic.

Conferences were held with architects, commercial advertisers, interior decorators, representing painters, decorators, and paper hangers, ornamental plasterers, lithographers, photographers, photo-engravers, printers, window trimmers, woodworkers, and manufacturers of art-glass jewelry, and women's clothing. The last named is treated in Chapter XV, which represents material gathered almost entirely from stenographic notes taken at these conferences and checked and approved by the trades. All the other lines are considered in this chapter, and practically all of the material has been taken from the stenographic notes of these conferences.

It was necessary at the outset to draw a distinct line between the training in art which all persons should have to live intelligent and refined lives, and that which the workman may need to produce goods of better form, color, and finish. The first has aptly been called training for the sake of appreciation, and the second training for the sake of production.

This study was not concerned with the art training needed for complete living or correct appreciation and taste in pictures, statuary, furniture, or any other commodity. The attempt was, rather, to find how far it would be possible to educate the workers in the "art lines of industry" in such a way that the product they manufacture may be more pleasing in design and finish and therefore more valuable to them and their employers.

ART-GLASS MANUFACTURING.

Eight firms in Minneapolis, employing about 300 persons, manufacture stained-glass windows and similar products. The glass is not made in the city, but is bought elsewhere and cut to the design

furnished by the Minneapolis firm or the person with whom the contract is made. Some of the glass is finished in colors and some in flat tints. The four chief employees are the designer, the painter, the cutter, and the glazier. The first three may improve the product by their taste or artistic skill.

The designers, who lay out the design and specify the colors, usually are professional artists. Even where no colored glass is used, the designer makes the skeleton layout for the cutter. Most of the designers have been imported from Chicago or New York, while one is a graduate of the old Art School of Minneapolis. The designer needs an understanding of the process of window making, which at present he gets only in the business. Usually the firm has a number of apprentices, who carry out instructions and get a start in the business. This, with further study, probably will fit them to become head designers. The opportunity for employment in this line is very limited and does not seem to justify special courses. Doubtless some young men now in the designer's office may be benefited by evening classes in industrial design of general character. Some of them now do nightwork in the Art Institute and some belong to the Attic Club, whose members do sketching.

The cutter takes the plan of the designer and chooses, cuts, and adapts the pieces of colored glass to fit the design and produce the color effects of the designer, who in turn follows the instructions of the architect or other person contracting for the window. Each color is designated by a number, which may represent a wide range of hues, from which the cutter must select those that will produce the results desired. In this taste in the selection of colors lies the greatest contribution which the cutters, of whom there are about 55 in Minneapolis, make to the value of the product. Cutters are trained by the helper system and, after serving as glaziers, are promoted. No special instruction is given, the men learning entirely by experience.

Painters of stained glass, of whom there are about 20 in Minneapolis, paint the figures on stained glass. These workers have ability and, usually, special training as artists. No special training in painting on glass is given, the men learning entirely by practice. The present method of obtaining these men seems to be the best, and doubtless will be continued.

Educating the taste of the public. All the manufacturers complained that their efforts to do high-grade work are hampered and defeated by a lack, on the part of their customers, of taste and appreciation for good work. Windows often are ordered from low-grade stock patterns. Quantity and size take the place of quality and artistic effects. The effort to produce imposing windows at low prices compels the manufacturer to make windows of which

he himself does not approve. This condition, by no means confined to Minneapolis, will be remedied only through the slow process by which the taste of the American people is being improved.

The student from the art school has little chance to enter the art-glass industry at present. Employers say that young persons applying for positions often bring samples of their work, not realizing the special problems involved in the designing of stained glass where the lines are so different from those of the pen-and-ink or water-color sketch. "There is a great deal of merit," they say, "to what these applicants show, but it is entirely foreign to our work, though it could be adapted to furniture designing or interior decorating." These employers believe that "if in his course of training the art student had been given an opportunity to see what is required of the designer in art-glass work, there would have been a chance for him in the business."

All the employers point out the small number of workers in the industry at present, and the very small part of these—practically not more than 30 per cent—who can in any way affect the artistic appearance of the product. The employers doubt whether any considerable number would attend evening school, and do not believe the number of workers in the business would be of much help. They say: "Improvement must come largely through better taste on the part of the public, which will make necessary a better product, requiring in turn better workmanship"; and "What is needed most is a more careful selection of workers having more talent, a better system of apprenticeship training in the shop, and the development of the craftsman spirit in the men."

The employers are of the opinion that the cutter and glazier, as well as apprentice designer, would be helped by evening classes.

The special information which would benefit the apprentice designer includes designing, lettering, and color. Designing should include principles of decorative design, figure drawing, composition work, landscape drawing and coloring, and decorative design. Underlettering, historic styles, and adaptation of letters to design should be considered. Color should cover all such things as analysis, harmony, contrast, matching, and color schemes.

ARCHITECTURE.

A telephone directory for 1916 reports a total of 62 employing architects in the city.

The business of the architect seems to be, from the number of new buildings, in a flourishing condition. However, the architects consulted by the survey were keen in pointing out certain defects in the system of obtaining and training workers for a profession mak-

ing increasingly large demands and offering increasingly large opportunities to capable, well-equipped young persons.

They feel that there is a very real danger of overcrowding the profession with beginners who are poorly trained or have no special aptitude for the work. The fault lies in the absence of a definite plan among architects as a fraternity for selecting new employees, of definite standards as to the ability and preparation needed, and of definite requirements as to the further training which the new worker must receive.

Those without aptitude or training must always perform the mechanical drudgery of the drafting room and receive a permanently low wage. The work requires, for any measure of success, a broad training in the history of architecture, painting, sculpture, and decoration, to be acquired only by years of travel and study; a knowledge of design, structure of material, and processes; and, above all, passion for the beautiful in architecture that comes only with years of enthusiastic practice and study.

While the architects consulted by the survey believe that the present four-year course in architecture at the University of Minnesota is ideal in some respects for a few exceptional men, practically all regard it as too much congested with other things, valuable but not necessary to the average man seeking preparation for work in architecture. Furthermore, these things take up time needed for a more practical study of architectural work, such as of materials and specifications.

A plan of training for bridging the gap between the theory of the school and the practice of the profession was suggested by one architect and met with considerable approval. This plan has developed into a scheme of cooperation between the Minnesota chapter of the American Institute of Architects and the Department of Architecture of the State University.

The plan is to provide an opportunity for each student to enter an office and serve as assistant during a part of each day for one semester in his third year. This year has been chosen as the most favorable point in the student's studies for two reasons. By that time he will have acquired sufficient knowledge and skill to grasp intelligently, and enter helpfully into, the processes of office work, and he will have another year of study to which he can bring wider views of the relation of theory and practice.

Incidentally this touch with the practicing profession will give him an acquaintance with older men which will be of great value when the problem of getting a start lies directly before him.

The plan is to provide also for young men with ability to draw and an interest in the work who are not attending the day classes of the university but who come to the architect's office as soon as gradu-

ated from high school. It was the feeling of all the architects that persons entering the work, even if they did not expect to advance beyond positions as draftsmen, should have at least a complete high school education, and that the drawing taught in the high school should help to discover those with special aptitude.

Arrangements could be made for the attendance of these young office workers upon evening classes in architectural subjects offered by the General Extension Division of the University of Minnesota or by the Dunwoody Institute, or for attendance on the classes in free-hand drawing at the Minneapolis School of Art. There could be an understanding among these institutions to avoid overlap and duplication of effort while providing all the courses necessary to meet the needs of the evening school students of architecture. It would be possible for students to work out their credits at the university partly in day and partly in evening classes.

This plan proposes also that the employer take a greater interest in his young draftsmen and that a systematic plan of experience and instruction be worked out. The architects of the city might formulate in conference with the head of the university's department of architecture a course of study and experience for new employees. A drafting room could be fitted up in a building centrally located, like the Dunwoody Institute, where practical everyday problems could be given for the young student to work out.

Architects could take turns in providing problems and preparing the first sketch, leaving the students to work it out each for himself. A certain amount of time could be given to this and the architect could call once or twice a week and offer such criticisms as he saw fit. There might be operated in connection with the plan a 40-minute noon lecture course somewhere in the center of the city, where architects and students would give talks, perhaps illustrated, on various phases of the work.

The plan presents a definite scheme for a system of apprenticeship in the profession. It seems to offer about the only method by which the present supply of workers can be improved. Only the architects can take the initiative, however willing other agencies may be to help. The scheme appeals even more to the interest of the architect in his calling and in his employees than to any prospect of immediate personal gain in his business, though some gain, in the opinion of the architects themselves, is certain to come.

There is too much of a tendency for the young man who has given four years, almost entirely within college walls, to training for the profession, to regard his education and study as finished when it has really only begun. A draftsman is not always an architect. To be a good architect requires more than an ability to make beautiful sketches. A good architect needs a great amount of technical knowl-

edge of the strength of materials, structural design, cost estimating, and many other things. Most of this knowledge the young draftsman must get after he begins work. At present he picks it up in a scattered unsystematic way, without direction or assistance. The plan described would provide an opportunity to get it by further training in service.

Another thing which architects deplore is the lack of originality. Minneapolis, like other cities, has few architects who can design buildings out of the ordinary or not in the conventional historic styles. They believe that this lack of originality is due in part to the conventional character of much of the early training, which, by laying such great emphasis on historic styles, inculcates the belief in the student that "there is nothing new under the sun."

If it is desirable to erect buildings that are original and good in design, proportion, and style, it will be necessary to give wider scope to the imagination and freer play to the native genius of young architects, that they may evolve new things from the old and use the wealth of material about them for inspiration and help.

Only by some plan joined in by the profession of the city as a whole, whereby the young architect will be encouraged to allow full play to his imagination and given more help in working out his designs, can this valuable and much-needed contribution to architecture be gained. Some such plan as is outlined in the foregoing pages seems to promise most toward this end.

COMMERCIAL ADVERTISING.

From conferences held with advertising people, it would appear that the field for this work is not overcrowded. There are 25 houses in the city doing advertising. The chief essentials are originality and the ability to draw, letter, and color. The work in most offices employing artists or layout men is done in this way:

A manuscript is handed to the layout man, who makes a rough layout suggesting what is wanted. Sometimes he submits sketches to the customer. The layout man makes the working drawing for the engraver, and an assistant, if the business is large enough to require assistants, works out the details. This minimizes the cost and one layout man can keep a number of artists busy.

The pay for layout men ranges from \$25 to \$200 or more a week. The best artists under him make from \$25 to \$100 a week, but many work for much less. A good layout man is worth almost any price, as the work requires artistic ability, originality, and rare judgment. A knowledge of printing and engraving is necessary, and some understanding of merchandising and selling.

A man should have a good art training and a knowledge of the different processes of reproduction, and should be able to illustrate

any copy that may be handed to him. The usual method of training in the offices or shops is to take in a young man who shows ability to draw and have him work beside the experienced men and pick up what he can. If he is ambitious he may go to an art school evenings and try to perfect himself in those phases of the work in which he is deficient.

There is no organized method of training either inside or outside the offices of commercial advertisers. The business is a comparatively new one in Minneapolis, as it is practically everywhere. Thus far the successful persons are those with special talent for the work who have grown up with the business.

Commercial advertising firms have the same experience with applicants for positions as art-glass manufacturers. Young persons able to make creditable black and white sketches apply for positions, offering samples of their work for inspection. They have no idea of the special problems of the commercial advertiser and seldom can get a foothold in the office. Advertisers believe, however, that if during the course of training in art some time were given to the special work of the commercial advertiser some of these young persons might get a good start in the business.

Most of the work must be learned in the business itself after finishing the regular school. Employers believe that the best results in special study would be from evening classes, where young persons already at work as learners or apprentices could get technical training. This should include a study of type faces and their appropriate uses with design and ornament; layouts, covering the planning of ads, pages, circulars, posters, pamphlets, and books; historic styles and their uses with design; the making of original and geometric designs, and the conventionalizing and repeating of designs; analysis and theory of color, color mixing, matching, and reproduction; illustration, composition, and figure drawing.

Much of an advertising man's success comes from digesting the effects obtained in the advertising of various lines of business all over the country, even over the world. He must know why certain methods are used, what are successful and what are not, and the trend of the time in advertising literature and illustration.

The commercial advertisers interviewed believe that a word of warning should be given "the all too-sanguine crop of budding geniuses of the present day" who are striving to enter the business. "The advertisements of correspondence schools throw a false light on the situation," they say. The profession makes peculiar demands upon the worker far beyond the mere ability to sketch, and is likely, after all, to be poorly paid. Much is made of the successes but nothing is said of the great number of so-called commercial artists who fall in a rut and fail to get out.

INTERIOR DECORATING.

There are five firms in Minneapolis, with about 250 employees, engaged in interior decorating. The work is well organized and quite highly specialized. Work of all grades is done and the field is large and growing. The special occupations represented are upholstering, carving, cabinetmaking, painting, and decorating.

Upholstering is a trade in itself. It requires some strength and skill of hand, a knowledge of fabrics, and of how to place springs. The upholsterer must be able to read and work from drawings. A knowledge of the different periods and styles of furniture and ornament would be a source of inspiration to him. There appears to be no well-organized method of training apprentices. Most of them pick up their knowledge by the helper system. The trade is not overcrowded nor especially hard to learn and could be taught by any good upholsterer either by the part-time plan or in the shop. It is doubtful whether it could be well taught in evening schools, as the work is necessarily slow. The upholsterers employed are so few that it would be difficult to form a class.

Carving by hand is becoming a lost art. There are few good carvers to-day, and none are being trained. The work is interesting and well paid. Qualifications necessary are skill in the handling of tools, a knowledge of woods, some knowledge of modeling, a feeling for design and form, and the ability to read working drawings. Familiarity with the various periods or historic schools of furniture would be a great help. No organized effort to teach the trade is being carried on in the city so far as is known. The work could be taught successfully by any competent carver either by day or night instruction, but the field is so limited and the number of carvers so small that the prospects do not warrant establishing a class.

Few **cabinetmakers** are employed by interior decorators in the city, only 50 being reported. There seems to be a large and increasing demand for good men, interested in their work, ambitious, and skillful in executing good designs in furniture. The pay is good and the work very interesting. The chief requisites are a knowledge of woods, joining, and structural design, a feeling for line and form, skill in handling tools and machinery, and, above all, a love for the work. There are few first-class cabinetmakers in this country, and few are being trained. This would appear to be a good field for educational work, as the trade could be taught by the apprenticeship plan either whole or part time in day schools. The limited demand for high-grade cabinetmakers, however, does not justify the establishment of a day class in art training, and it is doubtful whether instruction could be carried on by evening schools, owing to the time required to do any work that would be worth while. A course in de-

sign covering the historic periods of furniture making and training in color and decoration would benefit the men.

In paper hanging and painting there is great room for improvement and chance for expansion and progress. Though there are a great many paper hangers and decorators in a city like this, there are too few good ones; they are getting scarcer every year, and few are being trained to take their places. Training, if it can be called such, is by the helper method for ordinary house decoration—meaning papering and wood finishing—and this plan of picking up crumbs, as it were, from older men in the business produces poor results. A more systematized, better organized method of training would be along the lines of a part-time plan by which the apprentice might practice his trade and broaden his horizon in school at the same time. A course in design, color, painting, and modeling and a reading of the history of art would help him.

While a course of drawing in decorative design would be a good thing for the painter to start with, the school work should focus on active practice upon wall or canvas in the making of decorations from designs furnished by the leather designers and stenciled or drawn by hand, as the case may require, and from original designs of the student. This course should be open to all painters who seek advancement in wage and position.

The designer and the salesman work together and are the best paid men in the business. Both should have a thorough training in the periods of design and historic ornament. Sketches of interiors in color are made by the designer and are shown to the customer by the salesman. When O. K'd they are worked out by the decorators from details furnished by the designer, stenciled on the wall, or drawn by hand, as the case may require. The designer not only should be an artist but should have the technical knowledge acquired only through experience and long practice. The work is well paid and interesting and can be taught by any good man in the business.

While the business of interior decorating in Minneapolis is growing rapidly and serving a somewhat extensive field in the Northwest, the number of employees in any one line, as upholstering, hand carving, cabinetmaking, designing, and salesmanship is so small that there is practically no chance for special classes giving training in productive art separately to each of these. The best plan, in the opinion of those in the business, would be to offer evening classes which would enable the men to get instruction in historic ornament, original design, geometric repeating, conventionalizing, stenciling, working drawings, interiors, and perspective; analysis, theory, harmony and contrast in color, color mixing and matching, and color schemes; historic styles, construction, modeling, and carving of furniture; texture, manufacture, and color schemes for fabrics; manufac-

ture and color schemes for carpets and rugs. Of all these, the employers believe a study of historic ornament or period design is most important.

Interior decorators, like art-glass manufacturers and commercial advertisers, believe that much could be gained if art students were given, before leaving school, some instruction in special kinds of work, so as to have an understanding of the opportunities and demands before making a choice of an occupation.

JEWELRY MANUFACTURING.

There are seven manufacturing jewelry establishments in Minneapolis, employing about 100 men. The work done is principally special-order jewelry which can not be found in the regular retail jewelers' stock. These manufacturing jewelers are called upon to originate designs for special-order work, which necessitates the employment of the designer, the jewelry craftsman, the engraver, the enameler, the polisher, and plater. The term "jewelry craftsman" is used here to distinguish from the man whose business is to sell jewelry as merchandise.

The work is generally divided as follows: The designer originates the design according to the demands of the order. To meet the idea and taste of the buyer he must know the peculiarities of the business and be able to make sketches and working drawings that may be carried out in the precious metal. The design is then given to the craftsman to execute in metal, by such processes as melting, molding, cutting, filing, and soldering, providing also for the setting of stones or jewels. The work is generally passed on to the engraver for modeling, chasing or engraving, enamel ornamentation, inscription or monogram.

The engraver in a jewelry factory generally is the designer. To become proficient requires many years of application. The factory engraver is required to do all kinds of work, while the engraver in a retail store does only lettering or marking of silverware and inscriptions of watches and other jewelry sold.

The maker or jeweler is the craftsman of the business who makes the jewelry from designs or ideas furnished. Modeling is an essential part of a jeweler's training, but few know how to do it. A knowledge is required of metals, how to mold them into shape and how to plate and finish the product in a workmanlike manner.

Owing to the limited field and the attractions of lines of work learned in less time and paying higher wages, jewelry manufacturers must depend largely upon foreign labor, men taught their trade in the long apprenticeships customary in Europe.

Employers are doubtful as to the practicability of a school course in jewelry, but believe that if an evening class in designing were es-

tablished some engravers and jewelers would attend. The workers need the essentials of constructive design as related to metals for mountings, modeling, historic ornament and lettering, analysis and theory of color, harmony and contrast of color, and color schemes.

Employers do not believe that there is any field for new workers which would justify paying much attention to preparation for the business before leaving school. They think it would be helpful if talented young persons taking art training were given some understanding of the problems and demands of jewelry designing.

LITHOGRAPHING.

There are about 100 lithographers in Minneapolis, employed by five firms. Lithography is the art of drawing on and printing from stone. The design or writing is done with a sharp-pointed stylus on a soft stone known as lithographer's stone. The figure so drawn is then covered with a greasy material. The process depends, in the main, upon the antipathy between grease and water, which prevents a printing ink containing oil from adhering to wetted parts of the stone not containing the design.

Lithography to-day may be divided into two distinct processes: That of printing directly from the stone, wherein the drawing is reversed on the stone so that the impression on paper will be positive; and the rubber blanket or offset process, wherein the drawing is made positive, transferred to the zinc plate and offset on the rubber roller or blanket, which in turn prints on the paper. Upon this reversing of impressions, together with the known properties of certain substances to retain or reject grease and water, the principle of lithography is based.

When printing from stone in commercial lithographing, the design is drawn on paper, engraved or photographed on stone or zinc, transferred to the printing stone or zinc plate, and printed. The offset process is an outgrowth brought about by need for greater speed in printing than is possible on stone by the hand method.

There are four distinct lines of work in lithography, each requiring a high degree of skill and patience. The artist or engraver works directly on the stone or zinc or on paper. The proofer pulls proofs, in black or in colors, from the artist's work. The transferrer takes impressions from the stone and sticks them up on the layout sheet in page form to transfer to the printing plate or stone. The pressman prints with a press from the lithographer's form. Engravers are paid \$20 to \$75 a week, according to ability; transferrers, proofers, and pressmen receive \$20 to \$35.

Lithography requires not only artistic ability but great patience and a knowledge of chemistry, as chemistry plays a large part in

the success of the work. This report is concerned only with the question of how the art side of the business may be improved.

The engraver must have exceptional talent in drawing, as well as a good foundation training and experience. To a less extent, there is a need for similar ability and preparation for the transferer and proofer. These two positions are not separated in small shops, and even in the larger ones men work at both tasks interchangeably. Transferrers and proofers are seldom promoted to be engravers, the latter being a class by themselves.

There is a system of apprenticeship for engraving but not for transferring. The engravers are strongly organized. It requires all of the usual four years of apprenticeship for an apprentice to become so skilled that his work will always be acceptable.

Apprentices usually are obtained by advertising. Applicants are required to bring samples of their drawings and their ability is judged by these. It is difficult to get boys with ability who will work for the low wage paid at first. The new boy usually is taken on for a probation period of four weeks. Pay is increased as he improves in his work. The shop foreman gives some instruction in lettering and drawing, but apprentices are expected to supplement this by attendance at an art school, which few of them do. After becoming proficient in the formation of letters, they are trained in the cutting of letters in stone.

The trade believes that only a better system of apprenticeship would meet the need for better engravers. This would involve a more careful selection of workers and a better system of training. The engraver's position pays good wages and should attract a greater number of boys with artistic ability from whom apprentices could be selected. Systematic instruction, both textual and manipulative, is desirable; most of this can not be given in the shop but should be given in part-time or evening schools, preferably the former. New processes and materials are continually arising, and these could be taught better outside than in the shop. Furthermore, the shop can not give the art education which is needed.

The engraver needs, first of all, a thorough foundation in the formation and character of all styles of lettering. He should have a general knowledge of the process followed so as to produce his work in such a way that no defects will appear during its progress through the shop. This would include the sizes and kinds of paper used, the difficulties in reproducing the job in the transfer room, the difficulties in printing on the different kinds of paper, the effect of various colors on different kinds of paper, and the combinations of colors as they are used in the fundamental progress of the job. He should have some knowledge of the action of chemicals on the

stone upon which he works and of the chemical action of the different colors on the stone.

Owing to the increased use of the camera in the lithographic trades, a knowledge of photography is highly desirable. This should include actual taking of pictures, enlarging and reducing, and photographing subjects through a photo-engraver's screen in order to transfer them to the stone or zinc, as well as the effects of the chemicals used in lithography upon the stone or zinc.

Employers think it would be highly desirable for the art school to arrange for its students a series of lectures by the best designers in the different art trades, including some engravers from the lithographing business. These lectures, while few in number for any one line, would give at least an elementary idea of the difficulties to be encountered and the kind of work required. In this way the students might find their best interest and aptitude in some line of commercial art, and the lectures would serve as an excellent scheme of vocational guidance and direction.

So far as journeyman engravers are concerned, they can be reached only by evening classes. Their number is so small that it might be difficult to get a class, though the employers believe that for a course in the designing of letters about 15 could be found. Most men are not taught to draw letters correctly.

The things which engravers most need are lectures and actual practice under direction in the making of layouts, including the planning of pages, margins, and ads, and the laying out of letters and jobs; lettering, including all the historic style script, special and fancy letters, initials, monograms, and trade-marks; composition, including the planning of a picture, light and shade, perspective, and figure drawing; and color, including analysis, theory, matching, color schemes, and at least an elementary knowledge of the mixing of inks, as it has to do with the lithographic business.

The transferrer needs much knowledge and skill in the practical operations of his work. All of it can be acquired in routine work save the practical chemistry of the ingredients of materials used and the effects upon his ink plate or stone.

Lectures and actual practice in the photographic art as applied to lithography also are needed. This art he must learn from books or from school, preferably the latter. It could be taught in evening classes, though the lithographers point out the difficulty of finding a competent teacher who is practical as well as possessed of the technical information. A knowledge of design and proportion would help him in his work, though not absolutely required.

The pressman, in addition to a knowledge of the mechanical parts of his press and of the surface, strength, hardening, and absorbing qualities of paper, must have a general knowledge of the chemistry

of the business, so that he can judge of the effects of the acids and materials with which he is working. He should have a knowledge of photography as used in the lithographic trade. He must know the ingredients of inks and their chemical effect so as to guard against trouble. He must be skilled in the mixing of colors to be able to reproduce tints and shades, if necessary, and produce colors by combination; he must know, for example, what shades of green the different yellows and blues will produce. The pressman would profit by the instruction in regard to color suggested for engravers.

ORNAMENTAL PLASTERING.

Many buildings, such as churches, theaters, and pretentious residences, require a considerable amount of ornamental work in plaster. This is usually done by small independent shops which take the contract from the architect or the general contractor. As a rule, it includes columns, moldings, and cornices, which are made in the shop and either nailed in position or set in plaster.

The process of making ornamental figures, such as capitals and fluted columns, is interesting. A detailed drawing is usually sent to the shop, with a sketch or photograph of the cast desired. From this sketch or photograph a modeler will make a model of one of the parts; for example, if the desired figure is a capital for a column of four parts which are alike, the modeler will make one-fourth of the figure. He must be capable of reproducing in solid material what is represented by the photograph or sketch. He must have considerable artistic ability and a great deal of skill in the handling of modeling tools.

When the clay model is complete, it is covered with a coat of shellac. The case maker then covers this model with a coat of soft clay from half an inch to an inch thick. Outside of this he applies a thick, heavy coat of plaster of Paris. When the plaster sets, it is carefully removed from the model and the soft clay is removed. The case of plaster of Paris is then returned to position, and into the space formerly filled with soft clay a mixture of thin glue is poured and allowed partly to harden. The outside case of plaster of Paris is again taken off and the case of plastic glue is carefully removed and is put back into the plaster case to hold its shape. Into this case of glue a mixture of water and plaster of Paris is poured. The caster splashes or slaps the plaster of Paris into all the crevices of the glue form. He then pours in a mixture of hemp and plaster. When this sets, the outer casing of plaster is removed and the glue case is carefully taken from the cast, which now is a perfect duplicate of the clay model made by the modeler.

Where long runs of cornice or moldings are required, a modeler makes a clay model of one section. The case maker makes one case

and one cast, and by duplicating this he makes a section 5 or 6 feet long. When one such section is completed he makes a case for it and can then make as many sections as are needed.

Shops doing this work also employ model makers who make the models or templates for all long runs of moldings or of columns or pilasters. A model maker must have some artistic ability and a thorough knowledge of drawing and plan reading.

Modelers receive 75 cents to \$1 an hour, and at present there are only five in Minneapolis. Model makers receive 70 to 75 cents an hour, and casters, of whom there are 40 or 50, receive 35 to 50 cents an hour. As no provision has been made for the training of modelers, workmen capable of doing this work are rare. The modelers in Minneapolis are Italians and Germans, who learned their trade in Europe. Casters require a knowledge of materials used in the trade and some skill in the handling of casts. They require no artistic training or knowledge of plan reading, as they follow orders from the modeler and work from his models.

As no provision has yet been made for training men to do ornamental plastering, Minneapolis is dependent on a supply of trained men from Europe. The number employed is so small that no special class for those engaged in it is feasible.

PHOTOGRAPHING.

Minneapolis has 10 large photographers, with about 50 employees in all, and quite a number of smaller studios.

There is no organized attempt to teach the work here. In two schools in this country photography is taught, one at Effingham, Ill., and the other at McMinnville, Tenn. A chair of photography has recently been installed in Columbia University.

The larger studios employ operators, salesmen, printers, retouchers, and finishers. The best paid people are the salesmen and operators, who are paid \$30 to \$80 a week. Their work is the most important, as they meet the customers and have the most to do with getting orders.

The operator takes the picture and must be an artist as well as a good camera man.

The printer prints from the negative made by the operator, receiving from \$18 to \$30 a week. His work requires a knowledge of art, chemistry, and the values of different papers in effect produced, cost, and handling.

The retoucher is next important, as his work has to do with the finished product. He retouches negatives to bring out certain effects desired in the prints and must know how to work in light and shade, sometimes in color. He is paid \$15 to \$25 a week.

The finisher takes the prints, finishes the surfaces, and mounts them, this being the last stage in the process. Not so much skill is required, but good taste and judgment are necessary to mount the prints properly. Finishers are paid \$5 to \$15 a week. The photographers interviewed think that any means of training people for the business would be welcomed by all the photographers. While many of the people in the work have come in as amateurs, perhaps the greater number have just drifted into it.

The portrait business seems to be thriving. Employers say that they need more and better trained help, and that a class of 30 to 40 could be formed if the work included photo-engraving.

In view of the findings as to number of persons employed or interested, it would seem that a course of study might be worked out and a teacher employed to conduct the work.

Suggested course of study: The camera, its history, development, and practical handling; light and shade, lighting effects, and so forth; retouching and finishing; chemistry related to photography; plates and films and their manufacture; papers and their uses; color photography; three-color and four-color processes; etching copper and zinc; preparation of plates, sensitizing stripping; printing on plates of copper or zinc; stopping out plates.

PHOTO-ENGRAVING.

There are 8 firms and about 200 workers in the engraving business in Minneapolis. Half-tone engravers take a drawing, painting, or photograph, screen it on the camera, print or etch it on copper, and finish the plate for the printer. There are several trades represented in the business, including artist, photographer, stripper, etcher, finisher, and router. It will not be possible here to describe the work of each of these. The artist and photographer prepare copy from which the other workers produce the engraving ready for the pressroom.

In addition to the training in drawing needed, several of the operations require a knowledge of photography and chemistry, and considerable skill of hand such as is required in the finishing process of tooling, done entirely by hand.

Employers of art engravers believe that drawing and chemistry are the subjects in which the help of a school is most needed. One firm, the Bureau of Engraving, has already established a correspondence school in drawing, designed to make those in the business proficient in drawing for engraving purposes. Drawing for the engraver's business is highly specialized. Some beautiful drawings can not be reproduced by the engraver successfully. The proper drawings for the engraver often look like Chinese puzzles, but they are really

keys for production later on. Even teachers of drawing find it impossible without special instruction to make satisfactory designs for the engraver. In the opinion of the trade, the only person who could teach this work would be a man who is already an artist in the business.

The company carrying on correspondence instruction has met with unexpected success both inside and outside Minneapolis, having now about 160 students enrolled here. A class meets Wednesday night of each week during the winter months and lectures are given by experts. At present 100 students are attending these lectures.

The artist in the art department should be a graduate of an art school before undertaking to make drawings for engraving. He would then have a fundamental knowledge of art which many artists in engraving establishments have not. The great difficulty at present is that many graduates who apply for positions with engravers are unable to do the work. They can make beautiful drawings in black and white, but, not understanding the demands of the engraver's art, can not make drawings that will reproduce properly.

Like the employers in practically all other lines where commercial art is a factor, engravers believe it is desirable to arrange for the day student of the Minneapolis School of Art a series of lectures and demonstrations by artists from different lines of production. In this way the students would understand some of the problems involved in making drawings for purposes of reproduction and the consequent special and peculiar demand upon the artist. There is no place in the country, so far as is known, where a school gives special instruction to prospective artists for the engraving business. Most of the tricks and demands of the work must be learned in the business itself.

The number of artists employed in the engraving business in Minneapolis is so small that they may be almost disregarded in dealing with the question of further training in art for the employees. In the judgment of the trade, some of these artists would profit very much by courses in drawing. The engravers believe that evening classes would be the best means of reaching the workers in the mechanical end of the business, such as the engraver, etcher, and finisher. These, of course, would be ambitious men who were seeking advancement in wage or position. They undoubtedly need, most of all, practical instruction in chemistry relating to their business. "Along with this, however," the trade believes, "there should be opportunities in every school for them to get instruction and practice in drawing, color, light and shade, and what constitutes a picture."

"Every etcher should have a certain amount of artistic knowledge to know when he has etched certain parts deep enough or light

enough. He may be very skillful mechanically and yet fail because he does not appreciate light nor shade nor colors." The photo-engraver should know when he has everything in the negative that is in the copy. By manipulating the negative he may produce in the picture greater contrast than is in the copy.

"The proofer should know how to mix colors and combinations to produce desired results."

There is a system of apprenticeship for the mechanical side of the engraving business, which is strongly organized. The apprentice comes to the work entirely without training in the art, chemistry, or mechanical processes. Employers complain that many of these boys can never develop a high degree of artistic skill. They feel that there is great need of school training for these apprentices and that a part-time school would be the best plan, but that, under present conditions, an evening school wherein the apprentice could get instruction in drawing and chemistry with the journeyman is the most feasible. The Photo-Engravers' Union is of the same opinion. When the idea of promotional evening classes in these subjects was presented to the union, it was unanimously indorsed.

What the engravers call drawing includes much more than the term means ordinarily. They believe that the classes should give instructions through lectures, demonstrations, and actual practice in letters and lettering, including historic style, monograms, initials, and trademarks; design, including historic ornament, essentials of decorative design, geometric layouts and units, and conventionalizing; composition, including light and shade, color reproduction, and what constitutes a picture; and color, including analysis, theory, mixing and matching, schemes and processes.

Employers and employees believe that it would be possible to get a group of 12 to 15 to attend special classes in art engraving.

PRINTING.

The general facts about the printing trade have been given in Chapter X. Separate sections of the present chapter deal with photo-engraving and lithographing. There remains the question as to what art training the compositor and pressman need.

The compositor who sets straight matter or operates a linotype or monotype machine has little opportunity to use discretion as to general design or type face. Kind of type, size, and length of line or measure are specified on slips attached to copy or on the copy itself. Style, including such things as capitalization, indentation, italics, boldface, and arbitrary punctuation, also is given and must be religiously followed. This is true of practically all straight reading matter. Because of the increasingly high degree of specialization, the opportunity for learning beyond one's specialty is becoming

less and less. In small shops the compositor may still exercise originality and individuality in arrangement.

The whole tendency is to center on one man in the office the planning and designing of all work other than straight matter. In the larger shop an artist is employed to make layouts, which include instructions for lettering and grouping for advertisements, catalogues, books, and circulars. This artist and designer has usually been trained in an art school, and gets good pay. In the smaller shop this task falls upon the proprietor or foreman or a compositor with unusual talent.

A course in typographical design would, in the opinion of the trade, be most attractive to the compositor seeking to advance to foreman of a small shop or head of a department in a larger one. A two-year course in the evening, for compositors already in the trade, should include letter families, their harmony and contrast; value of white space; relation of solid matter to display; grouping with regard to ideas; and effect of color on solid and display composition. This should be accompanied by an elementary course in lettering and drawing, with original design—historic, geometric, and conventional—from floral, animal, and abstract motifs; typographic ornament, including borders, ornaments, head and end pieces, title pages, book plates, and cover designs; color analysis and theory, harmony and contrast of colors, with color schemes and the mixing of colors to produce desired shades.

The printers state that almost every office in the city has some one who would be interested in taking up such a course. Most offices have a considerable amount and desire more of what they call the better grades of work and would like to develop men who would stand out in the trade or to develop further those who already stand out as the best in the office. The printers think also that a great many salesmen would be interested.

The pressmen need, the trade thinks, a course of lectures and practical presswork in color, similar to that outlined for compositors.

WINDOW TRIMMING.

From conference with display men it would seem that this work is pretty well organized and the field limited. About 30 men are employed as window trimmers in the city. There is no school, and the men learn the business through the apprenticeship plan. Usually they enter the work from the stores, starting as clerks or salesmen and getting their knowledge of merchandise in this way. The qualifications necessary are good taste, artistic ability, a knowledge of goods and of salesmanship, color harmony and contrast, advertising display, and some knowledge of architecture.

A window trimmer needs to be an all-round man and to have some knowledge of color, painting, decorating, displaying goods to good advantage, sign writing, and of architecture and modeling.

The work is well paid and interesting, but does not seem to justify a special course, owing to the limited number of employees.

WOODWORKING.

Industrial art as a business is practically unknown in the wood-working plants of this city. The stock articles found in their catalogues are mostly the product of special designers employed only when there is a demand for a new catalogue or the revision of an old one. In many cases the designer is imported from other cities, such as Grand Rapids, for a few months. Sometimes the designs are made by nonresident designers and sent here. Frequently even the detailed drawings are so made and sent. All special work, such as interior cabinetwork of various kinds, is built from the plans of the architect, and all that is needed in the factory is a man who can take these plans and make full-size details for the guidance of the workmen. Usually this is done by the foreman.

In the practically unanimous opinion of employers the designer for furniture and millwork is in little demand, and there seems no way in which school training can be of much help.

What has been said about carving and cabinetmaking under "Interior decorating" applies also to furniture and millwork.

CONCLUSIONS AND RECOMMENDATIONS.

1. It seems apparent from the foregoing account of the art trades in Minneapolis that thus far very little special training has been given in the application of art to most of these trades. The task of providing this training in the city has the large advantage of a practically clear field for experiment and constructive work; but, on the other hand, those undertaking it can not profit at the outset by precedent and previous experience. All that can be done here is to present in a broad way some of the suggestions and possibilities which have received the approval of the art trades and of others interested in the better application of art to industry in Minneapolis. At the same time it must be recognized that any program must be worked out slowly and experimentally.

2. The interest and willingness of all the employers and employees in the art trades to cooperate in every possible way which the survey met in its investigation, together with the exceptional interest in the question which the people of Minneapolis have manifested through the art work of the public schools, the Minneapolis Art Institute, and the Handicraft Guild, promise not only hearty support to a program

of training in the industrial arts but intelligent cooperation in its accomplishment.

3. Minneapolis is growing rapidly, not only in population and wealth but in intelligence and taste. This means an ever-increasing demand from its citizens for those things that can be produced only by skilled labor; such things as more beautiful public buildings, schools, churches, and office structures; bridges, fountains, commemorative sculpture; homes, house yards, living rooms, furniture, and marble ware; rugs, textiles, wall papers; pictures, books, musical instruments, clothing, jewelry, household utensils, miniature sculpture; stationery, decorative devices for use in business and social life, such as seals, monograms, and bookplates; advertising material and printed matter of every kind; automobiles and other means of conveyance; in short, for every kind of thing through which a cultivated person's delight in life, in excellence, in beauty, and in the invisible things of the spirit can possibly express itself.

An enlightened self-interest, on the part of the city would take steps at once both to promote in every legitimate way the improvement of the taste of its people in the purchase and use of commodities and to supply the inevitable demand for better things by training its own citizens to meet it as fully as possible.

4. It is equally true that the manufacturers of Minneapolis, including those in the so-called art industries, rely, and must continue to rely, upon the people of the whole Northwest as the chief consumers of their products. To a considerable extent the same rapid growth—both in population and wealth and in intelligence and taste—so marked in Minneapolis is taking place over the whole territory to which Minneapolis must look for its largest and most permanent market. This means that Minneapolis must constantly improve the design and finish of its products to meet the rising standard of demand both in the city itself and in the vast country for which the city is coming to be the chief producer as well as jobber. If the art trades of the city are to take advantage of this large demand for better goods outside as well as inside Minneapolis, some arrangements must be made for the better training of more skilled and talented designers and workers in art lines.

5. The city in the Northwest country which begins now to uncover the latent artistic talent of its young people and trains them to use it in the production of commodities of higher excellence and beauty is the city that 25 years from now will command the rich market of the Northwest and realize manyfold upon its investment.

6. The city must see that each citizen is trained to do well what he is naturally best fitted to do for the highest good of all. The largest talent of many young people is the ability to draw beautiful things. In the absence of any properly equipped scheme to select and train

the talent of these young people either by the school or by the trades, this asset of taste and skill in the designing of art commodities, the richest in many respects which the industrial life of any community possesses, remains either undiscovered or untrained. In the first case it atrophies; in the second it never rises above a low level of achievement.

7. The foregoing study made no investigation of the work which various agencies are doing to improve the taste of all the people of Minneapolis in their selection and use of the goods made by the factories of the city and of other cities. The survey has recognized from the start, however, that in any program of art education for a city the effort to train all its citizens to have better standards as to form and finish in the selection and use of goods must go hand in hand with the effort to select and train young people of talent so that they may be able to produce commodities of better design and color to meet this rising standard of taste. Without a more intelligent appreciation of artistic work, there would be no demand upon the artisan for its production; without higher ideals and greater skill in production, the demand when created would remain unsatisfied.

8. The first large task, then, in Minneapolis is to raise the esthetic sense—the standard of taste in the selection and use of goods—of all the people. While other agencies must aid in the program, the foundation of it should be laid with the children in the public schools, which can affect the standards in art and life of every Minneapolis home and ultimately of every citizen and citizen to be. Through proper art training in the schools the unusually talented child would be discovered, whose aptitude in taste and skill would otherwise remain buried.

There have been many different art courses in the public schools of the country. Many of them have had commendable features. Most of them have been planned on the theory either that art has nothing to do with living, and that standards of taste in pictures and statuary are the only desirable ends in the teaching of art, or that a course of drawing in pencil and crayon and water color has the power in some mysterious way to develop in children a general instinct or faculty called the esthetic sense which will function properly not only in pictures and statuary but in all the other kindred phenomena of life as well.

The doctrine of formal discipline has long since been exploded. There are no general faculties of the mind which, like compartments of the brain, can be trained for effective use whenever called upon. If it is desired that children, as the home makers of the future, should have good taste in furniture, the boys must have a chance to see and make good furniture and the girls a chance to see and use it. If it is desired that girls and young women have correct

standards in dress, correct clothing and hats must be shown them, and, better still, a chance must be given them to apply correct principles in the making of simple garments. If they are, after a while, so to order their homes that there is simplicity, sincerity, and harmony in the selection and arrangement of wall paper, floor coverings, and furnishings, the chance, which many of them otherwise will never have, must be given them to see not only pictures but pleasing rooms through model apartments as an actual representation to them. This calls for a wider conception of the meaning of training in art than most of the schools have yet held and requires the use of many methods and devices besides crayon and drawing paper, excellent as they are as a part of the training.

It is probably true that if more refined tastes are given the worker in her selection of pictures or carpets or furniture for her own home, a greater interest and perhaps better standards in selecting and using material are developed in her when she has a chance in her own work. But it is much truer that the worker who learns to make pleasing and beautiful things in her own work acquires the ability to exercise this esthetic sense in her choice and use of the work of others. The best way to give girls correct standards for home buying is by courses in the schools, where they are taught to make things that both comfort the body and please the eye.

An interesting and valuable suggestion in regard to possible methods of educating the public for artistic consumption was made in connection with the conferences on the training of the home worker. It was pointed out that more intelligent purchasing power and artistic selection on the part of the purchasing public might be gained by the use of department stores as centers for lectures by specialists on various phases of home furnishings and decorations.

The advantages of such cooperation are numerous and obvious. Brief, practical, illuminating talks on design and harmony in furniture, rugs, hangings, and paper in conjunction with annual or semiannual sales of such goods would reach large groups of people who ordinarily would not have the initiative to attend such lectures at some school outside the shopping district. Some service along such lines is already being given in the art-needlework departments of various stores.

The gradual establishment of lectures on household decorations, of seasonable interest to buyers and at convenient hours in well-known easily accessible places, would tend to raise the general standard of appreciation of the shopping public.

A consulting bureau, where expert advice on problems of household arts could be obtained at a minimum charge, might well be a future development. This could easily be made the operating center

with public or private support for public lectures, not only on household arts and decorations but also on problems of municipal and community art.

9. Training through the schools in the practical arts, through drawing and prevocational training in the manual and household arts, should uncover the latent interest and talent of the few who have real ability to do original and creative work in the designing, coloring, and fashioning of material of one kind or another in industry. These have a precious asset which Minneapolis, like all other American cities, has taken no effective steps to develop properly. Talented children, through their school career, should have special attention and encouragement. At its close they should find waiting for them in Minneapolis courses in the applied as well as the fine arts, where their artistic sense and creative ability might be trained and conserved for the needs of the art trades of the city. Business interests should join hands with the educational and the art interests of the city, not only to establish and support an art school but to encourage and, if necessary, subsidize with scholarships the attendance of talented young persons upon it.

10. So far as vocational training in applied art is concerned, as contrasted with the prevocational training in art given by the public schools, the most important step which needs to be taken is to arrange for the consolidation or cooperation of all agencies now concerned in any way with the problem, in order that some systematic plan may be carried out and all overlapping and duplication of effort be avoided. In the opinion of the committee, any program of training in art for industry should center around the Minneapolis Art School and, so far as possible, the board of control for the school should serve as the chief agency in the cooperation of all the forces interested in the development of a better commercial art for the city. Any program for the development of vocational training in the applied arts should make use of the assets which follow.

The public schools of the city, through their courses in drawing and art, should serve as the chief agency for discovering talented boys and girls, encouraging their early efforts and directing them to the art school for further training after their public school education has been completed.

The School of Art which is housed in the Minneapolis Institute of Arts has been in existence about 30 years. Last year the school had a registration of about 200 students in all its courses, most of whom took the work in the fine arts. In addition to the fine-arts courses, instruction was given also in design, commercial work, interior decorating, illustrating, stenciling, wood-block printing, and ceramics. The attendance upon most of these courses was small.

Those engaged in the art trades of the city commend the soundness of the teaching of the fundamental principles of design and color in these courses, but feel that the school has laid its largest emphasis upon training in the fine arts and that the work in industrial art lacks the helpful contact with the art trades of the city that it should have.

The school has always been handicapped by a lack of funds to do its work and of late has been somewhat overshadowed by the necessary emphasis which had to be placed on the effort to obtain a suitable art building and an art collection in keeping with it.

At present a strong effort is being made to insure proper support for the school. A gift of \$25,000 has been made recently, which is to be used to build a separate building, while \$2,500 a year for three years has been contributed to the annual budget of the school. These gifts are being supplemented by a vigorous campaign for supporting memberships.

While all these things are promising as a beginning, they will not, unaided, furnish the resources necessary if the school is to meet properly the demands for training in either the fine or the applied arts. There is great need that the employers in the art trades should give substantial aid to the work in applied arts which can be made of such large help to their business. This they ought to do from the standpoint of professional pride in the improvement of the art trade in which they are engaged, if for no other reason. Persons of wealth in the city can find no investment for their benefactions which will yield more either to the refinement or the prosperity of Minneapolis in the future than gifts to the work of the school.

The committee believes that in the forward movement of the work of the School of Art these things should be done:

1. A competent director for the school should be engaged who will bring to the work the prestige which will command the respect and support of the country, and the ripened knowledge of art training in all its aspects which will insure the development of the work of the school on sound lines.

2. The fine-arts work and the applied-arts work should be separated as far as may be necessary for each to realize its aim. It is recognized that a considerable amount of correlation helps the work of both.

3. Close cooperation should be effected between the applied-arts courses and the art trades of the city in every possible way. This will mean, besides other things, the help of advisory committees from these trades in planning and carrying out the courses; special lectures by the best designers from the different art trades to students of the applied-arts courses on the special problems in designing of each trade—a thing which practically every one of the trades has

recommended; the development of part-time or evening classes of instruction for those already employed; a system of placement of pupils for further experience in the art trades either before or after graduation.

4. The taking over of the excellent work of the Handicraft Guild so as to center the art training of the city in one agency and avoid overlap and duplication.

5. Some scheme of cooperation between the School of Art and the Dunwoody Institute so that the two may help each other in the task of providing instruction in commercial art as one of the most important of the industrial and mechanical arts.

The museum of the Minneapolis Institute of Arts, located as it is in the same premises as the School of Art, has a most important part to play in any scheme of training for the commercial as well as the fine arts. This museum has already made promising beginnings in an art collection, which is constantly being augmented and which needs yet to be greatly extended in order that both the art student and the designer and artisan in each of the trades may get from their study correct ideas as to technique, color, and historic design. To these should be added, either as a part of the art museum or the equipment for the art school, collections of flora and fauna which furnish the best models in color and form for new designs.

This museum or gallery of arts should, in time, also present objectively the evolution of each principal craft chronologically, so that a carpenter, a metal worker, a jeweler, a lithographer, an engraver, a printer, or an illustrator could see for himself the growth and the triumphs of his particular craft as an inspiration to his own work.

Here also should be provided space where the best things accomplished by the designers and artisans in the different art crafts of the city may be exhibited, so that excellence may be encouraged and better standards in design and craftsmanship may be illustrated.

The William Hood Dunwoody Institute is dedicated, by the will of its founder, to the task of teaching the industrial and mechanical arts free to the youth of Minneapolis and Minnesota. Among these arts are those of the designer and the artisan in all such art trades as art glass, jewelry, printing, commercial advertising, lithography, photo-engraving, and interior decorating. It is doubtful whether money spent for other vocational training brings such large returns to the individual, to the industry, or to the community as that spent for the education in applied art of the talented youth.

While the institute will doubtless find it necessary to provide under its own roof for all the instruction in drawing and design which may be necessary to meet the needs of the boys preparing for the mechanical trades taught in its day school, the trustees of the Dunwoody fund might well consider, in the opinion of the

committee, the possibility of providing special training for the art trades of the city by some scheme of cooperation with the School of Art.

One plan suggested is that the trustees of the Dunwoody fund might create an annual free scholarship fund, of modest size at least, for the benefit of boys and girls in Minneapolis or throughout the State who have artistic talent and who would attend the art school to be trained to use it in commercial lines. These scholarships could be awarded by some well-qualified committee to those graduates of the high schools of the State who had shown in their work in drawing the greatest amount of interest and ability. In this way the art work of the city or State would be stimulated, the best talent would be discovered and brought to the art school for training, overlapping and duplication of effort as between the Dunwoody Institute and the art school would be avoided, the attendance upon the art school and its financial resources would receive a needed increase, and the Dunwoody Institute would give substantial aid to training in those industrial and mechanical arts which are commonly known as the art trades.

It would also be possible for the authorities of the two institutions to work out some scheme whereby the Dunwoody fund might subsidize, with the comparatively small amount necessary, free evening classes in industrial design for the benefit of designers and ambitious artisans employed in the various art trades.

The Handicraft Guild was established several years ago to train teachers for public school work in drawing and art. Last year the guild had a total attendance of 235 students, of whom 35 were registered for the full normal arts course of the regular school year and 200 for the short courses of the summer session. Courses in normal art are supplemented by instruction in design, composition, color, jewelry, stenciling, leather work, modeling, house decoration, metal work, pottery, and wood-block printing.

This school, which has been self-supporting, has undoubtedly served to meet a great need in the Northwest, particularly in Minneapolis and Minnesota. The committee believes that in the enlargement of the work of the School of Art some equitable plan should be devised for merging the work of the guild into that of the school.

The Attic Club, which has been in existence for several years, is an organization of young men and young women who are employed in different lines of commercial art. This group meets two evenings a week during the winter season. The members spend most of their time in sketching, usually from models. In order to be admitted to the organization applicants must submit samples of

their own art work to a committee on membership. The group is serious in its purpose and numbers among its members many of the most promising designers in the different art lines. As an organization this club is probably the most earnest and active force in the city so far as the field of commercial art is concerned. Some plan needs to be worked out whereby the School of Art may get the more active help of the club as a whole in the development of classes in applied design.

Representatives from the different art trades consulted by the survey believe that one of the most helpful things that could be established would be a series of special lectures and demonstrations given annually under the auspices of the Attic Club by expert designers engaged in the different art trades. In this way those engaged in each line would come to understand the special problems as well as the opportunities and possibilities of other art lines than their own. They would also have their point of view broadened with regard to the application of design in their own trade.

Such courses might well be opened to all interested and talented persons having a serious purpose. Attendance upon them would undoubtedly be very beneficial to the day students in industrial design at the art institute. In the membership of the club, including as it does some of the best designers of the city, would be found most of the special lecturers of the different trades. Where it was necessary to pay or to import lecturers the cost would be met in some cooperative way between the club and the school. One of the greatest aids which the Attic Club might render the School of Art would be to provide such special lecturers, who, at least in these days of financial stress at the school, would give their services for brief courses of lectures "as a professional contribution for the good of the cause."

The Minnesota State Art Society, through its State-wide activities in past years, has greatly helped the art movement in Minneapolis, its influence being felt more here perhaps than in any other city. While the former work of the society has been abruptly curtailed because of the failure of a short-sighted legislature to continue the customary appropriation from the State for its work, the organization is greatly helping the cause of better taste and better art by the success which its new publication "The Minnesotan" has already won. The helpful cooperation between the State society and the art school already established in the past should enable them to use this excellent medium of publicity to the largest advantage in promoting the cause of art training in Minneapolis.

11. The scheme proposed in the study on architects for the apprenticeship training of new workers in architects' offices seems to promise good results. It is now being tried by a few of the leading

firms. There is need, however, of concerted action on the part of all the architects of the city and the architectural department of the university so that the plan may be better organized and systematized.

12. The foregoing study of all the art trades shows that the total number of persons employed in each, and more particularly the number of persons in each trade who have to do with the design and appearance of the product, is so small that at present it would be impracticable to have special courses for specific trades, such as an art course for art-glass workers, or jewelry workers, or ornamental plasterers.

13. Wherever a sufficient number of students in the day classes or the evening classes of the art school desire special instruction for some one art trade, every consideration would justify the organization of a separate course. The committee believes that for most of the day students in applied art at the art school, the situation now requires, as has already been pointed out, general courses in industrial design with special lectures by experts from the different art trades.

14. The evening courses in applied arts for those already employed should be based as much as possible on common elements required in the different lines. A reading of the foregoing studies on the art trades shows that in most of them there is a common need for instruction in such things as historic ornament, decorative design, composition work, historic styles of lettering, adaptation of letters to design, color analysis, harmony, contrast, matching, and color schemes.

CHAPTER XX.

WHAT SHOULD THE CITY DO FOR TRAINING IN HOME GARDENING AND ELEMENTARY AGRICULTURE?

Conferences with groups and individuals representing every class in Minneapolis disclosed a unanimous feeling that the city had followed out the gardening idea far enough to warrant an investigation of the agencies interested, methods pursued, and results obtained, these facts to be a basis for an even more effective organization and extension of the gardening interest. Many reasons were advanced which led to this conclusion.

In many respects Minneapolis has the ideal conditions for the development of gardening projects. (1) The city is surrounded by the richest gardening districts in the State. (2) Perhaps no other city of its size has so many homes with ample space for garden spots, and there is a vast acreage of vacant lots. (3) A large percentage of the population is made up of foreign people who are eager to take up gardening if the opportunity and necessary instructions are available. (4) The city has a well-organized school system that may become a potent factor in working out the idea among pupils and patrons. (5) Finally, in the practical working out of the plan, Minneapolis has an advantage afforded by no other city of its size; it is the largest urban center with a State college of agriculture located on the border of the city.

In Minneapolis gardening is of city-wide interest and has passed the experimental stage. (1) Observations in various parts of the city prove conclusively that all classes are interested in the movement. Attempts to make the home spot beautiful by indoor plants, window boxes, landscape gardening, well-kept lawns and flower and vegetable gardens are everywhere in evidence. These are not confined to any one class of citizens, but to a greater or less extent represent the self-directed activities of members of all classes. (2) Several organizations have created a wholesome interest in the movement by their stimulative efforts of encouragement. Much credit is due to the Garden Club for its vigorous and successful campaign. Vegetable gardening, if widely and wisely followed, will mean much in the way of economic return to the community. If all available space within the city limits were utilized, it would mean a supply of fresh vegetables during the growing season for the majority of families. A liberal supply could be preserved for consumption during the winter. This would make unnecessary the present outlay for inferior vege-

tables and the saving made possible would tend to raise the standard of living of many families.

The gardening movement may be made of great vocational and educational value. (1) There are many people in the city who would be more successful on farms. It is possible that they are naturally rural-minded and would be better satisfied with farm life. The introduction of gardening projects into the school and home experiences of the city youth makes possible such vocational direction. (2) The whole movement is an educative process. For youths who find themselves adapted to rural life, it is a prerequisite in their vocational direction and training; for those who plan to spend their lives in the city it is largely a matter of culture, for they should have some appreciation of and sympathy with the class which must always direct its activities toward the production of the raw materials that supply the necessities of life.

If the movement is of so much significance to Minneapolis it should be placed under the direction of a civic agency and supported by public funds.

(1) If private organizations have shown the idea to be feasible and applicable for city-wide adoption, their function has been performed. The funds necessary for the venture on a large scale can be provided only through the public treasury. (2) If of city-wide interest and general educative value, it is incumbent on a democracy to assume the responsibility and burden of support.

The scope of study. In making the investigation an attempt was made to get such information as would answer these questions:

(1) What agencies have encouraged the gardening movement? What methods have they pursued? What degree of success have they achieved? What plans have they formulated for the future?

(2) What new agencies, if any, are planning to enter the field; and what special phase of the movement do they plan to encourage?

(3) To what extent have the agencies which have been interested in the movement in the past worked in cooperation?

(4) What possible fields present themselves for further cooperation between these and other organizations?

(5) Are all classes who should profit by the movement being reached; and if not, how may they be reached in the future?

(6) What are the arguments for and the field of the school garden, the vacant-lot garden, and the home garden?

(7) To what extent is there need of more technical instruction, of wider extension, and better supervision of gardening projects?

(8) How can such work be best organized and administered?

The information included in the study was carefully gathered by these methods:

(1) Interviews with persons taking a leading and active part in the agencies that have encouraged gardening projects.

(2) Soliciting opinions of competent and well-informed public-spirited citizens concerning the activities, results, and possible improvements of the methods used in past efforts along this line.

(3) Careful examination of the files of the daily newspapers of the city during the gardening season for the past five years.

(4) Two conferences, attended by representatives from the agencies interested.

(5) Investigation of the plans of organization adopted by other cities interested in municipal and school gardening projects.

(6) Advice of experts, such as members of the staff of the Department of Agriculture of the University of Minnesota and agents of the United States Department of Agriculture, were obtained through correspondence and frequent consultations.

The report which follows is a brief synopsis of the study made of home and school gardening.

THE GARDEN CLUB MOVEMENT.

The Garden Club of Minneapolis was organized in 1910 by a few public-spirited men as an experiment in civic betterment. Since that year the larger part of its membership has been made up of persons carrying on garden activities. The number of members reached 3,000 in 1913, but the average membership of other years has been 1,000 to 1,200. The annual fees have varied from 50 cents to \$1.50 for ordinary membership; \$1 to \$2.50 for members using vacant lots or having special help, such as plowing; and \$5 for honorary members. The movement has had hearty moral support and substantial financial support of various civic agencies, as well as individuals, both for the enlargement and improvement of the work and for meeting deficits from time to time.

The amount spent for the work each year has varied with the changing fortunes of the club. The average has been about \$3,500; the largest amount, about \$5,200, was spent in 1912, and the smallest during the present summer. In the effort to make the work self-supporting, the deficit for 1912 was \$2,000, that for 1913 was \$500, and that for 1915 was very small.

The scope and extent of the work likewise have varied from year to year. In the first year a newsboys' garden was directed by one woman. The following year the work was supervised by a graduate of the university's School of Agriculture, assisted by nine students of the school. Lectures on gardening were given by the force. Prizes were offered for the most successful gardeners. In cooperation with the public schools, the school gardens were maintained throughout the season. Members of the club were provided with garden plots, plowed free of charge, and free seeds were lavishly

distributed. Vacant lots were used by those not having suitable grounds, and bulletins containing helpful suggestions were distributed from time to time. Many persons who did not join the club were induced to grow flowers or vegetables. The club also cooperated in the movement to decorate the business districts with "hanging gardens" in the summer months.

According to the Minneapolis Tribune the 302 gardens cultivated in 1911 yielded produce worth nearly \$14,000. Space will not permit an account of the work of the hanging gardens committee of the Civic and Commerce Association nor of the experiment carried on in 1915 by the Northeast Neighborhood House in cooperation with the divisions of agricultural education and agricultural extension in the Department of Agriculture of the State University.

The effort to place the club on a self-supporting basis in 1912 reduced the supervisory force to a superintendent and one assistant. This made individual instruction impossible. Group instruction was given as far as the time of those in charge permitted. A book of instructions based on the experience of the preceding year was issued, while the supervisory force could be consulted at the office or, in special cases, at the garden itself. In each district a central garden was maintained for demonstration purposes where the supervisors at an appointed time met the gardeners of the district. More than 1,000 vacant lots were made to produce vegetables and flowers and a total of more than 160 acres was under cultivation, the produce being worth, according to the Tribune, over \$50,000. While the cost of administration and supervision, made more systematic but less extensive, increased about 50 per cent over 1911, the number of gardens increased over 400 per cent.

A superintendent without an assistant was employed for 1913. In the interest of economy, the service to members was much changed. The more costly items of service were reduced or dispensed with. The club had its largest membership, over 3,000, which made necessary an increase in the less costly services. Instruction was limited to that contained in the book. There is no definite information available as to the results of the year's work.

The story for 1914 and 1915 is about the same. Each year the management struggled with the problem of finances and each year the effort was renewed to make the work self-supporting by increasing the membership and reducing the expenses per member. The superintendent's time was given over almost entirely to this task. Further reductions were made in the services offered, with a compensating reduction in dues. To attract new members and induce prompt payment, premiums were offered for the immediate payment of membership dues. The club offered a lot and free plowing, each gardener to be responsible for the supervision of the plowman—a plan much

more satisfactory than any other used. The offerings of free seeds, plants, shrubs, and trees were increased. No information is available as to the result.

The hearty response given by the people to the work of the management, in spite of unfavorable conditions, indicates the warm esteem in which the club is held and the appreciative cooperation of the citizenship of Minneapolis.

Minneapolis is under deep obligation to the Garden Club movement. In many ways its influence has advanced the interests of the city and made more pleasant, congenial, and inspiring the life of its residents. The people's attention has been directed to a valuable asset in their family and civic life. Among the more significant results are:

- (1) A strong public sentiment for the spread of the movement.
- (2) During the years of greatest efficiency, much advertising for the city.
- (3) Large economic returns from the yield of the gardens.
- (4) Experiments worked out which are of much value in planning for the future.
- (5) The development of an appreciation of esthetic ideals, helped by the influence of the club.
- (6) Work in which the people of the city may spend their leisure time with profit to themselves and the community.
- (7) The influence of the club as an educative force among the people of the city.

Minneapolis is fortunate in having citizens who are willing to spend their time and thought for civic advancement. Much credit is due to those who have given so much to the cause. However, the movement has its limitations and handicaps. Some are not inherent in the organization, nor can they justly stand as criticisms against it. They come rather as the results of conditions which the present organization is unable to remove. The following conditions present the vital problems of the organization.

(1) **The lack of a dependable and adequate financial budget.** Not only is this the problem which most threatens the movement, but it is the source of many vexing situations. It indicates that an institution depending on subscriptions to swell a fund accruing from membership dues representing but a small fraction of the value of the services rendered can not carry on a project which must be put in practice throughout the city. The work is of city-wide interest and should be supported by a municipal organization financed by the city treasury, just as streets are paved and other public enterprises are carried out.

(2) **The movement has suffered from too frequent changes of superintendents.** A new superintendent has assumed the tasks almost every year since organization. This has been due not to inefficiency on the

part of those taking up the duties but rather to uncertainty of the term of employment. The length of service has been determined by the financial status of the organization. The position has always furnished only seasonal employment. It has not offered the lucrative returns necessary to encourage a thorough preparation for the work. A close acquaintance with the local field is required for efficient management. The superintendent should be of increased value each succeeding year. However, it has been impossible to induce the same man to continue in service for a number of years. The club has been very fortunate in inducing men of so high a grade to accept such seasonal employment.

(3) In recent years there has been a lack of instruction and supervision. It has been impossible for the field force to give the attention demanded. It is scarcely reasonable to suppose that city dwellers, 80 per cent of whom have never maintained a garden, with a book of instruction and a few Government bulletins but no practical information and experience, could acquire in one short season the information and experience necessary to plant and cultivate the wide variety of vegetables, flowers, shrubs, and trees with which the club supplied them.

There is need of frequent visitation and demonstration. The point of interest is not how many begin to garden in the spring, but how intelligently the work is pursued and how many finish the season. The recording of results had to be discontinued because of lack of funds.

(4) It has been impossible for the organization to extend the work as widely as it should be extended. The mass of the people, the wage earners, have not been reached. The club has been unable to reach the women and children with the supervision adequate for successful gardening enterprises. These two groups, in a great many cases, have the most leisure. The seasonal rush has made it impossible to work up the contests and exhibits necessary to sustain interest for the succeeding years. Organized efforts have not been followed for consecutive years because the retirement of the superintendent has permitted the enthusiasm to lag toward the end of the season, and new fields have been sought the next year by the new superintendent.

PLANS FOR THE FUTURE OF THE GARDEN CLUB.

It is impossible to predict the future policy of the Garden Club. It never has followed a definite plan of organization for consecutive years. Much depends on the management, and even more on its ability to get funds. In past years the club has launched a campaign each year to increase the membership, and to accomplish this aim a change in the plan of organization has been made. There is a strong feeling among the promoters that encouragement of landscape gar-

dening and lawn decoration rather than vegetable gardening should be emphasized this year.

GARDENING PROJECTS IN THE ELEMENTARY SCHOOLS OF MINNEAPOLIS.

The Minneapolis public-school system has made little progress in the garden movement. The work has been carried on under the direction of the department of hygiene and physical training. It has been experimental to a large degree and has never been systematically organized and administered.

Three schools maintained gardens in 1910. In the case of one the work was done in cooperation with the board of park commissioners, which provided the land and prepared the soil. The other gardens were on school property and were prepared by employees of the board of education directed by the school authorities.

The cost of carrying on this work amounted to about \$400, 75 per cent of which was salaries. The gardening in 1910 seems to have been largely experimental and without any definite purpose in mind as to its educative value. The form of the organization for instruction and supervision is not given in the records available. The recommendations for work in succeeding years appear to have been neutral, as there is no mention as to whether gardening should be extended or discontinued.

The Minneapolis schools made much more progress in 1911, when the field work was placed under the management of the superintendent of gardens for the Garden Club. An increased interest was aroused. Gardens were maintained by 10 schools within the city. Poor soil accounted for the failure of the undertaking in one school.

Preparatory instruction was given in the schools, and the ground was plowed and harrowed and divided into plots, one to each pupil. Attendance was required two afternoons a week for a period long enough to allow each gardener properly to care for the plants and to receive instruction. Attendance at the home gardens was looked after by the parents, who signed an agreement with the supervisor of gardening that they would require it.

The training was taken by 935 pupils, of whom 641 followed the work to the end of the season. So far as information has been obtained the attention given the home plots was satisfactory.

The school gardens of 1911 cost the board of education about \$1,200. Cooperation proved advantageous to all concerned. From information gathered through interviews with persons closely connected with the work, it is safe to conclude that it was very successful. All seem to have been satisfied. Many principals, teachers, and children were eager to continue, but the board of education, because of lack of funds, found it necessary to stop the work.

**GARDENING PROJECTS AND ELEMENTARY AGRICULTURE IN THE
CENTRAL HIGH SCHOOL.**

At the beginning of the movement in Central High School several years ago the gardens were planted in cigar boxes. These could be had for the asking and served to introduce the students to the work and to awaken an intense interest in the movement. Then window boxes were provided which permitted more extended work and resulted in a still wider growth of sentiment favoring gardening projects. Gradually the courses in botany were directed along practical rather than formal lines. When a new building was being planned provision was made for a greenhouse.

The new equipment has permitted a wider extension and much better instruction. The greenhouse has been found most useful. The courses in botany have been made still more practical, and students do real work in plant propagation.

It is required that all rooms in the building be tastefully and appropriately decorated. The teachers in cooperation with the students must maintain the standard. Whenever the building is to be used for a community meeting a committee on decorations must be appointed by the organization requesting such use. This committee works in cooperation with the instructor in charge of the greenhouse. Plants may be procured from the greenhouse for decorating the rooms. The requirement is equally binding on teachers, students, and patrons of the school, and is rigidly applied even to teachers' and committee meetings.

The removal of the school to its present location has made possible a more extensive and practical working out of the movement. The building is in the less congested district of the city, and a larger area may be had for agricultural purposes.

A department of agriculture has been organized. The school qualified for State aid given to high schools maintaining agricultural departments and an instructor is employed for the entire year. The following are the reasons for establishing the department:

(1) At least 100 students come from the market gardens in the neighborhood and are much interested in the cultivation of vegetables and small fruits. Many houses near the school have berry patches. The district south of the school, extending to the Minnesota River, is the richest market garden region in the State.

(2) Several large dairy farms are within this same district.

(3) Through the extension of the work to the summer season it is hoped to provide students with employment during the vacation. Many homes have ample space for garden spots. Vacant lots may be had in the thinly populated districts. Students under the supervision of the agricultural instructor may obtain profitable as well as educative employment for their vacations.

(4) The department will satisfy demands for specific vocations. Some students will want to continue as market gardeners and some to follow another phase of farming. Others may attend the College of Agriculture after completing the high school course.

(5) The development of esthetic ideals. Such a department in the high school may become a vital factor in inculcating a love of nature and an appreciative sense of the beautiful in many homes.

This department of agriculture will perform many services for the community. The following are some of the most important:

(1) The courses offered will make possible four years in agriculture, meeting the State university entrance requirements.

(2) A school farm or demonstration plot may be maintained. On this plot the students may receive practical training in connection with their classroom work.

(3) It is planned to make the study of botany even more practical by utilizing more fully the possibilities of the greenhouse.

(4) Under the expert direction of this department, the school grounds are to be planted to trees native to Minnesota. A well-developed plan of landscaping will be followed. The ideal is to have growing here every kind of tree to be found in the State.

(5) If the demand justifies, short courses in market gardening and small fruit growing will be offered during the winter to those engaged in the market garden business, the aim being to supply practical instruction in the growing of market produce.

(6) The department will offer its services to the people of its community in all ways that may be helpful. It will give assistance in the carrying out of home projects. At appropriate seasons of the year, lectures and demonstrations will be given in landscape and home gardening activities, so arranged that adults who can not attend the regular sessions may be accommodated.

ADVANTAGES AND DISADVANTAGES OF SCHOOL, VACANT-LOT, AND HOME GARDENING.

Many difficult questions are yet to be worked out in the home and school gardening work of American cities. It is impossible to consider all of them here. Perhaps the most urgent is that of the use and place of school, vacant-lot and home gardening, and to this brief space is given.

A policy must be determined in regard to the emphasis to be placed on each type. Each has its advantages and disadvantages and its possibilities of educative value.

The school garden offers the following advantages:

(1) It is favorable to the stirring up of enthusiasm and the forming of a group sentiment.

(2) The soil may be better prepared for garden work and its fertility kept in a high state with more certainty.

(3) It makes possible the opportunity to teach social lessons.

(4) The plan offers economy in instruction and supervision.

The school garden has the following disadvantages:

(1) It is often difficult to get a suitable tract of land in the neighborhood of the school.

(2) In most cases the plot has to be subdivided into very small units to accommodate the pupils, and only small gardens may be carried on.

(3) There is an absence of real ownership. The individual fails to find himself as such. He is still a part of the whole.

(4) The movement does not connect the school with the home life to any greater extent than other school activities.

(5) The fact that it is more difficult to teach individuals, as such, than to give group instruction leads to the sacrifice of the individual in order to enjoy the economy in effort and finances afforded by formalized group instruction.

The vacant-lot garden offers the following advantages:

(1) In many parts of the city a number of vacant lots might well be utilized for gardening purposes.

(2) The lots usually allow of larger gardens and the appeal of economic returns to the children may be made.

The vacant-lot garden has the following disadvantages:

(1) A change of ownership may mean building and the destruction of a growing garden.

(2) There is danger of neglect in vacation.

(3) In many cases, especially in the downtown districts, it is impossible to supply the demand for lots, while there may be an overabundant supply in the outlying districts.

The home garden has the following advantages:

(1) Practically all the advantages of the vacant-lot garden are present here. Many children find a garden spot available in their own home yard, and back yards are thus improved. The incentive of private ownership is present. Permanency is coincident with the tenure of the home. The gardens are in easy reach of the children.

(2) The economic returns enter to swell the family budget.

(3) A closer relationship is established between the school and the home.

(4) The children are encouraged to spend their leisure time at home.

(5) There is parental cooperation.

The home garden has this disadvantage: The problem of giving instruction and supervision to the individual is much greater than in the school garden.

CONCLUSIONS.

(1) **The school garden is of much value** in the introduction of the work and for instruction and demonstration purposes. However, it is merely a means to the end. The enthusiasm of the group is essential to the introduction of the project. Advantage should be taken of the economy offered by group instruction, providing that the dangers from such instruction are carefully guarded.

(2) **The vacant-lot garden offers many attractive inducements** to the children who have the capacity and ambition to undertake enterprises on a large scale. The boy who feels the need of earning money will be attracted to the vacant-lot garden. It will usually attract the stronger and more ambitious. Whenever a strong energetic boy can be accommodated with a vacant-lot garden, it is safe to say he will receive a training that will be of great value.

(3) **The home garden is the one which offers the most promising and lasting results.** It should be made the most important part of the movement. The gardening activities will not have reached the highest degree of efficiency until the gardens reach the home yards. The greatest amount of educational value is made possible when the movement becomes a part of the home experience of the family.

The conclusions are supported not only by the analysis that preceded them but by two other arguments. They represent the views of practically all the experts in this field who were consulted. They are in harmony with the results obtained in those school systems that have made progress in gardening projects. The greatest degree of success has been met in those places where the vacant-lot and home gardens increase in number while less emphasis is being placed on the school garden.

A tentative plan for the introduction of gardening into the elementary schools of Minneapolis was submitted at a conference by the superintendent of schools, who offered the plan as a feasible and workable one to be followed out in the city school system. The plan for organization is shown in graphic form in Chart I. The detailed information concerning the plan of organization is found in the interpretation of this chart.

Chart II is a representation of how the plan for instruction is to be worked out. The detailed information on how it will be administered is found in the interpretation of the chart which accompanies it.

Chart III is a representation of how the plan correlates with other educational forces of the city and the State toward specific vocational training. The possibilities afforded the youth of Minneapolis are dwelt upon in detail in the interpretation of the chart which accompanies it.

INTERPRETATION OF CHART I: HOW EDUCATIONAL FORCES ARE COOPERATING TO INTRODUCE GARDENING INTO THE PUBLIC ELEMENTARY SCHOOLS OF MINNEAPOLIS.

Representatives of the various cooperating agencies contributing aid and services to the movement have promised the amount of assistance necessary to carry out the plan submitted to the conference. The details of the plan follow:

The University's Department of Agriculture offered aid from the division of agricultural education and that of agricultural extension. Members of the regular staff and students of the former are to perform the services extended to the movement and members of the regular staff of the latter will cooperate.

The division of agricultural education promises:

(1) The services of a member of the staff giving half his time to the charge of the work at the opening of the garden season.

(2) Assistance from the division by a member of the regular staff, giving time equal to one day a week during the winter in the organization of nature-study work for the grade children that will prepare them for garden work in the spring. This aid is to consist of outlining the subject material and giving teachers such assistance as they may need in preparing them to give instruction.

(3) Assistance in supervision of the gardens by college students taking certain specified course work. The amount of time given to this work and the number of students participating in it will depend on the possible program adjustments and the number of students enrolled in the specified course. It is planned to have these students give instruction to the pupils in the schools. The assistants will be under the charge of the member of the staff who performs the supervisory duties.

(4) Organization of a course dealing with the methods in school-garden work. This course will be given in the College of Agriculture in the second semester as a part of the existing courses. The students will receive practical work in the supervision of gardens under the direction of the member of the staff who has supervisory charge of the work in the public schools.

The student supervisors will work without pay until the close of the college year. The credit given on the college courses and the practical training received are to be their reward. After the close of the college year the board of education is to arrange for pay for such assistants as it may desire to retain throughout the vacation season.

The aid offered through the division of agricultural extension is to be given by members of the regular staff who have charge of the boys' and girls' club work in the State. This aid is to consist of services along the three lines following.

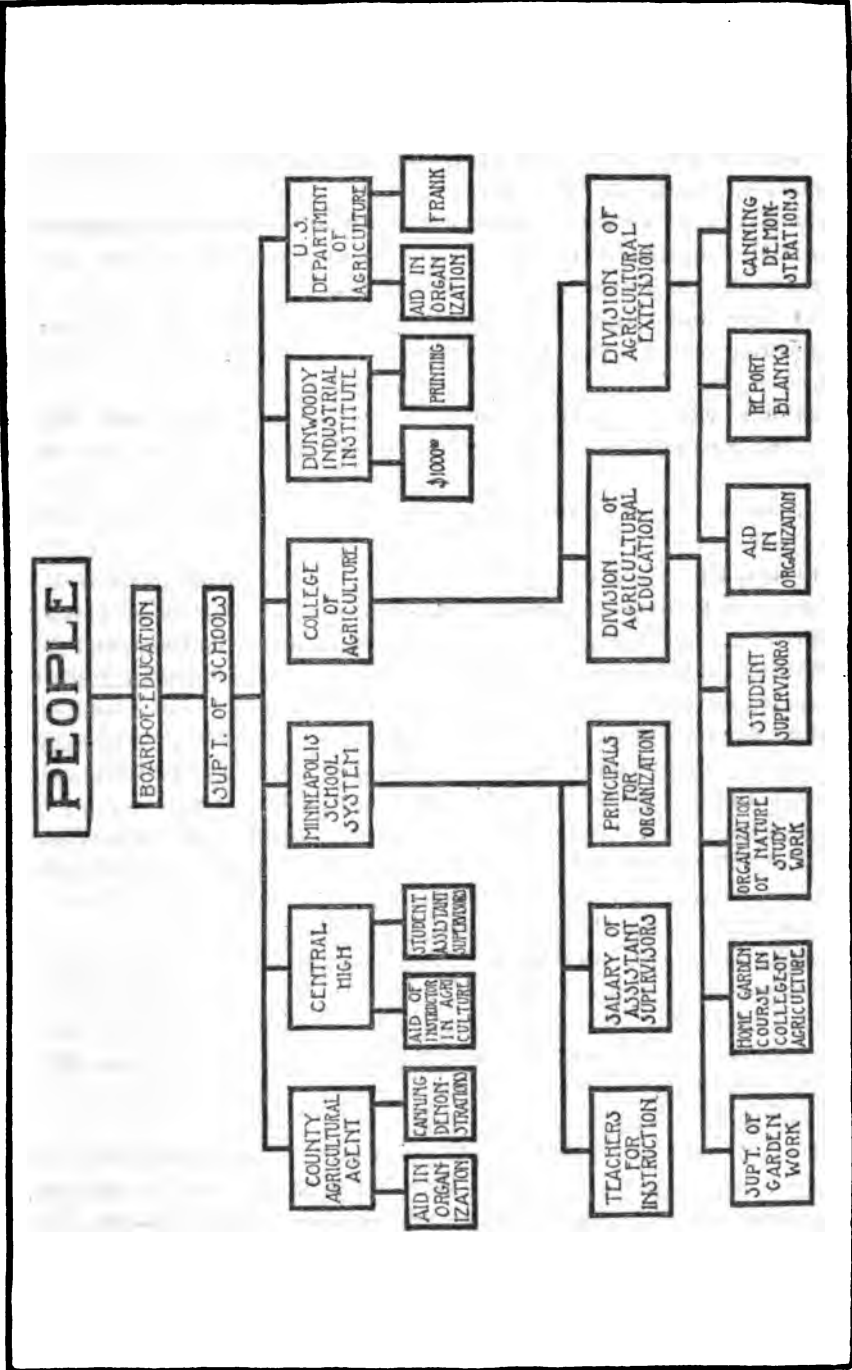


CHART I.

- (1) Aid in the work of organizing the boys and girls into clubs.
- (2) A supply of blanks for accounts and reports of the work of the individuals will be provided.
- (3) The members of the staff who have charge of the work in canning demonstrations throughout the State will devote as much of their time as they find necessary or possible to supplying the services needed along this line.

The Minneapolis school system offers three kinds of aids to the project:

- (1) The assistance of the principals and the mechanism of the school plant for purposes of organization.
- (2) The assistance of the teachers for purposes of instruction. This refers to the work in nature study which prepares for the garden activities.
- (3) The school system provides the salaries of the assistant supervisors of gardens whose services are retained throughout the vacations.

The Dunwoody Industrial Institute will aid the movement in two ways:

- (1) Such printing as may be needed by the department from time to time will be done in the printing department of the institution.
- (2) The Dunwoody fund will provide finances to the amount of \$1,000 for the first year in order to put the department on a working basis. According to the plan submitted this amount will be applied by the Department of Agriculture of the University in providing the services to come from the division of agricultural education.

Services offered by Central High School are of two types:

- (1) Part-time aid from the head of the agricultural department.
- (2) As the work in the high school progresses, it is expected that students will be trained who will be able to take up the work of assistant supervisors for the school system.

The United States Department of Agriculture can be of assistance to the project in two directions:

- (1) It can offer considerable aid in the organization of the work. The services of a member of the staff working on boys' and girls' club work can be had for the work of organizing the school children into clubs.

- (2) A representative of the Department has suggested the possibility that the privilege of the frank may be extended to the work in Minneapolis on recommendation of the chief of his division. This would give the department the use of the United States mail free of charge, which would mean a saving of several hundred dollars in postage yearly.

The agricultural agent of Hennepin County can assist the movement in at least two ways: (1) In the organization of the work; (2) during the canning seasons by demonstrations.

INTERPRETATION OF CHART II: HOW INSTRUCTION IN GARDENING WILL BE GIVEN IN THE ELEMENTARY SCHOOLS OF MINNEAPOLIS.

Direct supervision of the work in gardening instruction will be placed in charge of a member of the staff of the division of agricultural education in the University's Department of Agriculture, who will be responsible to the superintendent of schools and who will be known as the supervisor of gardening.

Instruction will be given by the various agencies composing the teaching staff, of which the supervisor of gardening shall have oversight. Through these agencies instruction in gardening and elementary agriculture will reach all the schools in which sufficient demand may arise for such work.

The first instruction the pupil receives in gardening will be in connection with his regular school work, and will be given by his regular teacher, thus providing, at the beginning, close correlation with the rest of the school work.

The teachers offering this instruction in nature-study work are to be trained by the member of the staff from the division of agricultural education who is to have the organization of the subject material and the methods of instruction in his charge.

The students from the College of Agriculture and the high school who are to act as assistant supervisors will work on the teaching staff under the direct supervision of the supervisor of gardening. They will visit the pupils in their gardens from time to time, giving suggestions, encouragement, and instruction, and demonstrating, when necessary, how the work should be done. The garden work of the pupils will be under supervision and subject to inspection throughout the season. The pupil will be required to enter the work from the standpoint of the owner and administrator of a business project. He will be a practical gardener. He will be required to keep an accurate account of the expenses and the returns of the venture. The idea is to make the whole project an educative one.

The other members of the teaching staff, the high school instructor, the county agricultural agent, members of the staff in the university's agricultural extension division, and of the Federal Department of Agriculture, will aid the movement from time to time, always working in cooperation with the supervisor of gardening.

Cooperation of the elementary-school teachers and patrons of the school will be brought about through the principals of the grade schools. The supervisor of gardening, through the efforts of the teaching staff and his personal activity, will gain the cooperation of the principals of the elementary schools who wish to introduce the gardening project.

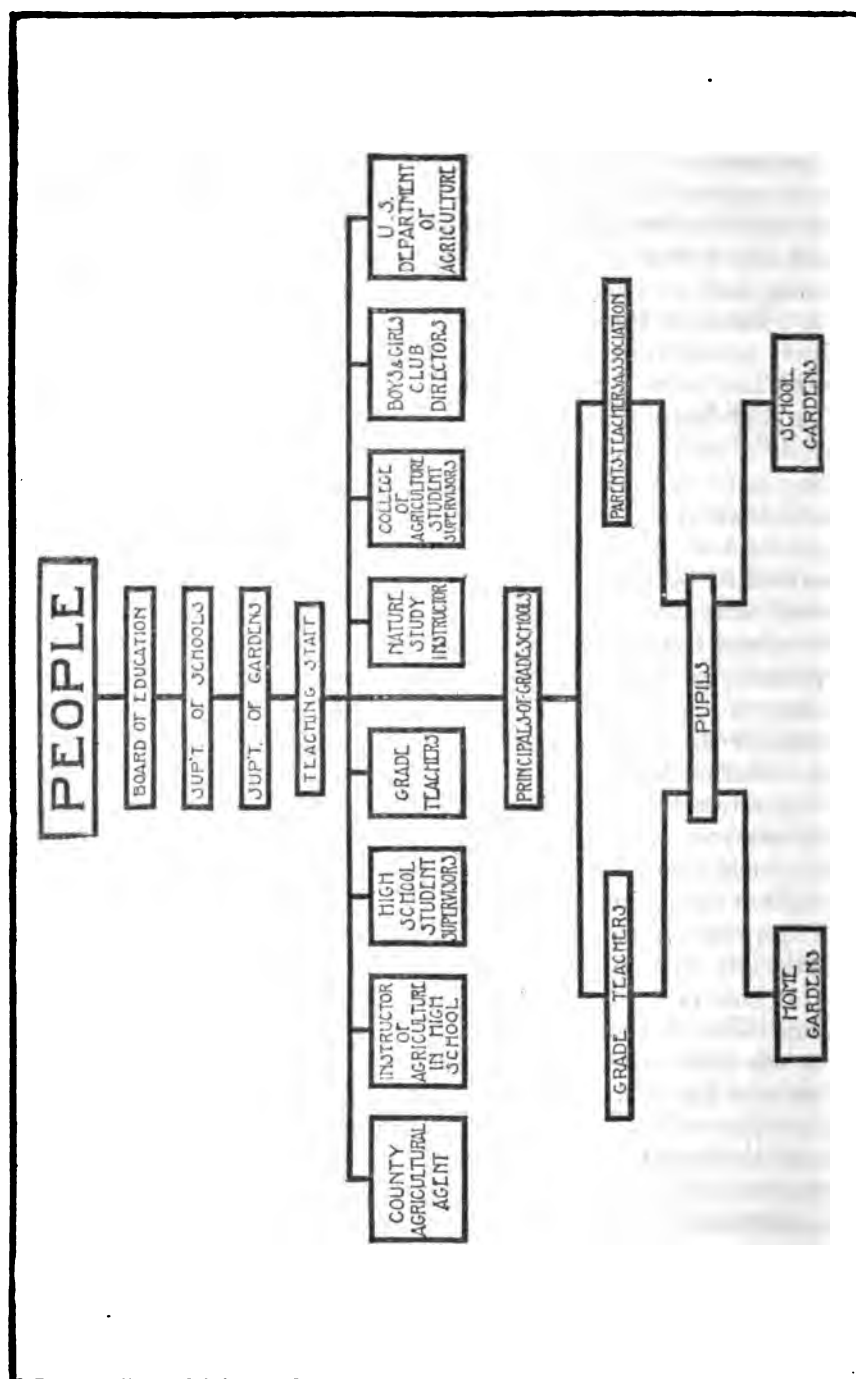


CHART II.

These principals, working through the grade teachers, will enlist in their schools the interest of the pupils who wish to take up the work in gardening. Instruction will be given the pupils in the schoolroom or on home gardens as may seem best in each case.

The fund available to the board of education for the employment of assistant supervisors the first year is limited. It is possible that service can not be provided for all the schools that make application. The board of education will assist in every case possible until the funds are exhausted. In cases that come up later it will likely be possible for the principals to organize their schools through cooperation with the Parents' and Teachers' Associations.

INTERPRETATION OF CHART III: THE OPPORTUNITIES FOR AGRICULTURAL EDUCATION AFFORDED BY THE CITY AND STATE SCHOOL SYSTEMS TO THE CHILDREN OF MINNEAPOLIS.

It is not contended that the introduction of gardening projects and elementary agriculture into the schools of Minneapolis is primarily for the encouragement of a "back to the farm" movement. Justification for the introduction of the work is found in the educative value inherent in the subject material and available, if properly utilized, for educational purposes. A statement of the chief argument for the introduction of garden work and elementary agriculture in the elementary schools may be formulated under improvement of three types derived by the pupils from it. Such a statement follows:

(1) All students pursuing the work will obtain cultural improvement from their efforts because:

(a) The laws of nature are revealed to the urban child in a more concrete manner than he is likely to experience in his later life.

(b) Love of the beautiful and esthetic is implanted in his life at an early age.

(c) The future dweller in the city will learn to appreciate the problems confronting the farmer.

(2) Improvement along the lines of increased social efficiency will result to the pupils of the schools in many ways.

(a) The work will lead toward greater solidarity of the home as a social institution.

(b) The home and school life will be linked more closely together.

(c) The pupil will be taught how to spend his leisure time in a profitable and wholesome manner. With the modern industrial tendencies, there is more leisure time given workingmen than there ever has been in the past.

(d) In the case of school gardens, an opportunity is offered to the tactful leader of boys to direct the gang spirit along useful lines of activities.

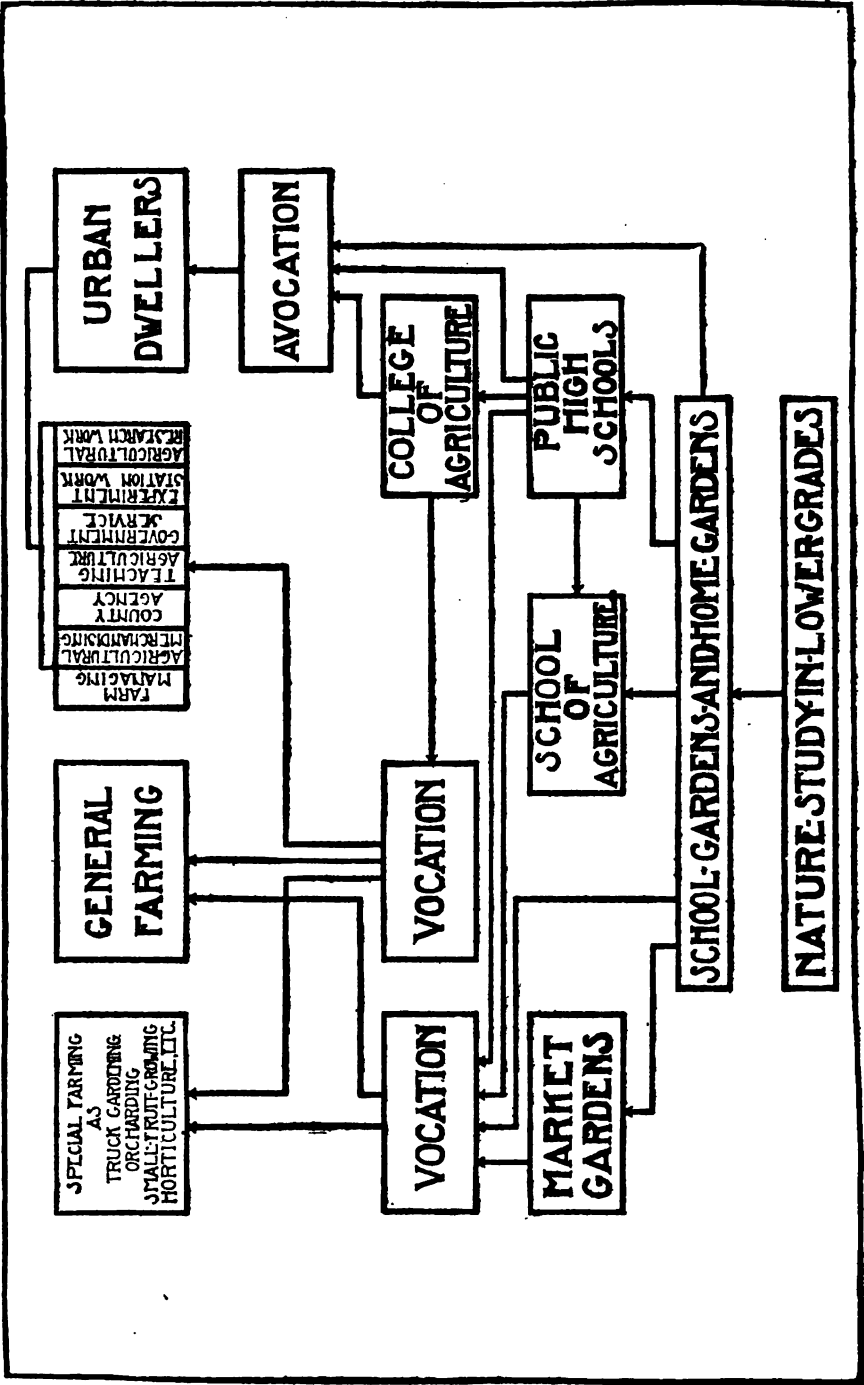


CHART III.

(e) The amount of cooperation necessary to carry out garden projects successfully provides a training that means much for effective social organization toward civic advancement, when the pupils have become citizens.

(3) A number of opportunities are afforded for the improvement of the industrial efficiency of future citizenship, through the training obtained in the garden work.

(a) It affords the individual a healthful means of relaxation.

(b) The children are encouraged to form habits of industry.

(c) The movement offers a splendid opportunity for the development of initiative, there being practically no limit to the amount of originality that may be applied in connection with a garden. Conditions of labor and environment often doom the citizen to become a mere cog in a great machine. If he is going to reach the highest degree of efficiency, he must be given an opportunity to develop initiative.

(d) Since modern industrial systems have been organized on a large-scale basis, the citizen often has little, if any, opportunity to enjoy the satisfaction derived from the feeling of ownership. The development of garden projects, especially home gardens, promises a practical method of extending the satisfaction derived from ownership to a large number of children.

(e) The pupils will be given more definite and practical information concerning the methods of modern business administration. The problem of procuring the funds necessary to operate a successful garden will bring them face to face with many situations similar to those met with in business on a larger scale.

(f) It offers an opportunity for vocational direction and education to the children of the city. The aptitude and desires of many children would make them better farmers than factory workers. One season's work in a garden will make it possible to find these individuals. To them, whatever training they may receive in gardening work and elementary agriculture will be vocational training.

Chart III shows the opportunities afforded to the children in the city for training in agricultural lines. It is safe to say that no other city of its size offers to its school children so many advantages for efficient agricultural training as will Minneapolis when the plan has been fully worked out.

All children in the elementary schools will be given some work in nature study. In those schools in which arrangements have been made for instruction in gardening, all desiring to take such work may do so.

A small group of those who find it necessary to get paying work and who like gardening will be attracted to the market gardens that

border the city. The training received in gardening activities in former seasons will have fitted them to become efficient workers.

A few of the ambitious ones who find it necessary to earn wages at an early age may get work on farms immediately after leaving the grades. Their experience in the garden and their natural aptitude for the work will serve them well.

In another group will be those who like farming but who must earn the money for more specialized training as a preparation for adopting it as a vocation. They will find other routes open to them. During the summer season they will be able, because of their gardening experience, to receive a reasonable wage working on a market gardening or general farm. In addition they will receive the necessary farm experience to admit them to the School of Agriculture, which opens the first of October and closes the last of March. After completing the course in the School of Agriculture they may enter farming as a vocation.

Others will find it possible to enter the agricultural department in Central High School on completing the grades. After completing the high school course they will be free to enter farming as a vocation or to pursue in the College of Agriculture the courses which lead to professions in agriculture. Among these professions, as indicated on the chart, are farm managing, agricultural merchandising, county farm advising, teachers of technical agricultural subjects in high schools, normal schools, and agricultural colleges, Government service, experiment-station work, and research work in agriculture.

CHAPTER XXI.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR OFFICE WORK?

This chapter presents a summary of the findings and conclusions resulting from a study of office work in Minneapolis, made under the auspices of the graduate economics department of the State university. It is not possible in the limits of this report to include the special studies for each type of work. The findings of these special studies are outlined in the summary beginning on page 496.

The study of office work is important, since Minneapolis is a great center of distribution in the West. The recording and computing of financial exchanges is one of the great interests of the city's business. According to the United States Census of 1910 there were 14,886 clerical workers, and this number probably does not include executive positions.

It is a field very complex in its scope. Practically every business or professional organization involves some office work. This varies from the small office where the proprietor himself does the book-keeping and correspondence, or where one employee is general factotum, to the great office in factory, railroad, or store where the subdivisions of work are manifold and the differences in the positions in various departments are very marked. The opportunities are very unlike in different kinds of business and in the subdivisions of a given establishment. Therefore, it is impossible to make a clean-cut classification of office work, and a clear idea of it involves a study of types of business offices as well as of the work therein.

The act of taking dictation and transcribing notes may be the same in any kind of business, but there are a great many combinations of stenography with other sorts of work which make it impossible to explain a stenographer's duties in a word. Again, the term "clerk" is indiscriminately applied to the most varying types of work. A man is called a clerk who fills out application blanks and receives people, and a man is called a clerk who does complicated statistical work in a great industry. More than 138 different positions were found in a group of 2,630 workers. The forms of office work required in establishments doing the same kind of busi-

ness bear a close resemblance, however, and differ in amount of subdivision and variety according to the size of the establishment.

The following groups were studied as being typical of the city:

Manufacturing:	Professional offices—Concluded.
Milling.	Physician.
Printing—	Hospital.
Job.	Architect.
Commercial newspapers.	Lawyer.
Iron and steel works.	Real estate.
Dyeing.	Insurance.
Box making.	Public service and utility:
Knitting.	Gas and electricity.
Automobiles.	Street railway.
Retail:	City and county.
Department store.	Hotel.
Specialty store.	Railroad.
Hardware.	Express.
Pianos.	Telephone.
Clothing, etc.	Telegraph.
Wholesale:	Unclassified:
Fruit and produce.	Banking.
General merchandise.	Transfer and storage.
Professional offices:	Grain.
Dentist.	

Some features of work are common to all these types of offices despite the differences in organization and requirements. From the standpoint of commercial education, which endeavors to train boys and girls that they may make an infinite number of adjustments according to opportunity, it is the knowledge of what is common that is important.

Office work may be recommended as fulfilling four of the essentials of a good vocation: Hours usually are not long; conditions of work generally are good; there is opportunity for interest and advancement; and wages are good as compared with other occupations of the same grade. Offices are not regularly inspected, but this study found only 10 that were unsatisfactory in lighting, ventilating, or ordinary comforts and conveniences. The minimum working-day is 6½ hours and the maximum 11, while most offices require from 8 to 8½ hours. Exceptional cases of sanitary conditions being inadequate and ventilating and lighting miserable were reported by an employment bureau closely in touch with every kind of office. These cases can not be remedied except through formal complaint, since offices are not included in inspection laws. The factory inspector reports that some firms doing a good deal of circular work employ their young girls overtime at certain seasons. There is no legal redress for this, since office workers are not included in laws restricting the hours of labor for women.

Except for its confinement, office work is a fairly healthful occupation. The strain is nervous rather than physical. Comments of workers indicate that continual work at the dictaphone and the card-punching machine may affect the hearing in the one case and produce soreness of the fingers in the other. Arrangement of machine operations so as to vary them with mental effort prevents such overstrain. Undoubtedly, however, a highly strung person had better not undertake an exacting position in any office.

Its opportunities for advancement seem almost infinite if the observation is founded on a knowledge of the natural ability, training, experience, and arduous effort required to lift a man or woman from lower to higher levels in a certain establishment or a particular kind of work. Though it keeps the ordinary worker at routine work, it offers the reward of promotion for unusual ability, expertness, or hard and faithful work. The rate of advancement is, however, unequal and haphazard. Few organizations have a regular system, although banks have begun to perfect one, and advancement may come either through change from one kind of work to another or through a higher salary and more responsibility in the same kind of work.

Wages in office work is too complex a subject to compress into a general statement. Not only do the salaries of bookkeepers differ from those of clerical and statistical workers and stenographers, but all such work is paid for at one rate by a wholesale house, at another by an insurance company, and at still another by a retail store.

As fairly representative of the middle strata in office work 389 records were selected at random from the miscellaneous files of a Minneapolis employment bureau for men and women, covering a period from 1911 to 1914, inclusive, and tabulated. Only the wages of the average office worker and not the extreme salaries were included, since neither well-paid people of established positions nor untrained workers of lower grade apply to this bureau.

TABLE 20.—OCCUPATION AND MONTHLY SALARIES OF OFFICE EMPLOYEES OF EACH SEX, CLASSIFIED ACCORDING TO DURATION OF EMPLOYMENT, AS SHOWN BY RECORDS OF A MINNEAPOLIS EMPLOYMENT BUREAU.

Occupation, sex, and duration of employment.	Number earning each classified salary per month.												Total records taken.	Range of monthly salaries.		
	\$20 and under \$30	\$30 and under \$35	\$35 and under \$40	\$40 and under \$45	\$45 and under \$50	\$50 and under \$55	\$55 and under \$60	\$60 and under \$65	\$65 and under \$70	\$70 and under \$80	\$80 and over.	Minimum.		Maximum.	Average.	
STENOGRAPHERS.																
Males:																
Less than 1 year				1		1				1		3	\$40.00	\$78.20	\$56.07	
1 to 3 years				1		1		5	1	3		11	40.00	75.00	61.15	
5 years and over							1	1		3		5	55.00	78.00	67.60	
Females:																
Less than 1 year	6	3	5	14	1	7	1		1			38	20.00	65.00	40.83	
1 to 3 years	1	10	11	16	9	26	8	6	6	5	1	99	26.00	100.00	49.37	
5 years and over					2	10	7	5	18	18	7	67	45.00	108.00	65.96	
BOOKKEEPERS.																
Males:																
Less than 1 year				1		2		1			1	5	42.40	100.00	60.88	
1 to 3 years				1		1		3	1	1	1	8	40.00	95.00	63.20	
5 years and over				1		1		1	1	5	7	16	43.40	140.00	81.00	
Females:																
Less than 1 year		1		1		2			1			5	34.70	66.66	49.79	
1 to 3 years	3	1		2	2	3	1	2				14	20.00	60.00	43.61	
5 years and over			1		1	1		3	3	6	4	19	36.00	86.90	60.06	
TYPING AND BILLING.																
Females: ¹																
Less than 1 year	1	1	1	1								4	26.00	40.00	33.23	
1 to 3 years		3		5		2		1	1			12	32.00	65.00	44.64	
5 years and over									2			2	65.20	65.20	65.20	
CLERICAL AND FILING.																
Males:																
Less than 1 year		1		1			2	1				5	34.70	60.00	48.94	
1 to 3 years			1	1		4	1	5	3		1	16	39.10	95.00	58.81	
5 years and over	1					1		1	2	2	3	10	20.00	100.00	70.14	
Females:																
Less than 1 year	5	2										7	21.70	34.70	26.64	
1 to 3 years	1	6	1	4	1			1	2			16	21.70	65.20	42.09	
5 years and over			1	1	1	2		2	2		1	10	39.10	90.00	56.90	
CASHIER AND COMBINATIONS.																
Males:																
Less than 1 year																
1 to 3 years																
5 years and over												1	85.00	85.00	85.00	
Females:																
Less than 1 year				2								2	40.00	43.40	41.70	
1 to 3 years			1			1				1	1	4	35.00	85.00	61.75	
5 years and over									2			2	65.20	66.20	65.20	
SUPERINTENDENCE AND EXECUTIVE.																
Males:																
Less than 1 year																
1 to 3 years						1			1	1	1	4	50.00	100.00	72.55	
5 years and over										1	2	3	75.00	90.00	82.74	
Females:																
Less than 1 year																
1 to 3 years										1		1	78.20	78.20	78.20	
5 years and over																
Total, males	1	1	1	7		12	4	18	9	17	17	87				
Total, females	17	27	21	46	17	54	17	20	38	31	14	302				
Grand total	18	28	22	53	17	66	21	38	47	48	31	389				

¹ No males reported in this occupation.

Although the education of these workers was not tabulated, it was observed in almost every case that for a high salary there was a corresponding high degree of education. That only 87 men as compared with 302 women had records in this file indicates that routine technical positions in offices are filled more generally by women than by men, although below and above this middle ground there is a much greater proportion of men and boys than of women.

Even in this small group of men certain typical truths about their employment in offices were observed. Decidedly they are used more for bookkeeping and clerical work than for stenography, and not at all for typewriting and billing. For stenographic work their salaries are no better than those of women, but the opposite is true for bookkeeping, since 43.8 per cent of the men as compared with 21.1 per cent of the women working more than five years receive over \$80 a month. The larger number of high salaries for clerical work also is received by men, and a higher ratio of men is found in executive positions. These facts are borne out by the individual investigation of Minneapolis offices, where the same relation of men's to women's work was found to obtain.

The largest group of women (204 out of 302) was found in stenography. A study of their salaries is interesting if a little discouraging. No girl working less than one year was paid over \$65 a month, 52.6 per cent receiving \$35 and under \$50. The 99 who had worked from one to three years formed the largest single group; the maximum wage was fairly high, but the large majority, 87.9 per cent, received less than \$65; 11.1 per cent received \$35 and under \$40; and 59.6 per cent received \$40 and under \$60—that is, a girl working at stenography from one to three years had only 1 chance in 8 of receiving a salary of \$65 or over. Those at work more than five years received higher salaries, although the average is only \$65.96 for stenography and \$69.06 for bookkeeping.

Against this study of a group divided according to kinds of work for men and women must be placed the report on wages from 84 offices grouped according to kinds of work and type of business. The average wage for stenography was lowest in the factory office, \$44, and highest in a grain commission office, \$80, while the highest single wage was \$150, found in a wholesale establishment and in the offices of an insurance agent and an architect. The lowest average salary for bookkeeping was paid in professional offices, \$52; printing and publishing houses paid the highest average wage, \$107, while the highest single wage, \$182, was found in a factory office. The lowest single wage for clerical work was \$22, paid by four business firms—a grain commission house, a printing and publishing establishment, a retail store, and a professional office.

The highest salaries paid for expert and executive positions can not be quoted, since they were not stated by employers. Undoubtedly there are many of several thousand dollars a year.

A comparison of the wage scale for office workers in Minneapolis with that of other cities can not be broad, since only Cleveland and Boston have made such studies, and both deal exclusively with women's work and wages. In Cleveland the average of the customary weekly wage for 2,816 women studied was \$11.65 in stenography, \$11.12¹ in bookkeeping, and \$8.50 in clerical work. Of 509 women office workers studied in Boston,² the great majority received between \$8 and \$12; 66 per cent of the stenographers, 65 per cent of the bookkeepers, and 87 per cent of the clerical workers received less than \$12. Of 9,488 stenographers placed in 1913 by five typewriter agencies, more than one-half received \$12 to \$15.

In conclusion it may be said that the wage scale for office work in Minneapolis compares favorably with that of other cities; that the initial wage is high and the maximum rather low; that men are paid at a higher rate for the same kind of work, in conformity with general custom, and that only the unusual people receive noticeably high salaries, whether men or women.

Certain general facts which stand out as true of office work distinguish this occupation from others. In the first place, it is not organized as a trade or profession and there is no system of probation or apprenticeship. As business is developing to-day, with its subdivision and routine, it does not demand for mere entrance, except in the case of stenography, a special equipment of training. On the other hand, the relation between lack of training or education and failure to advance is clearly apparent.

The entrance age is the legal age of employment for the lower and 18 to 20 years for the advanced initial positions. Interviews with men and women in positions of power and responsibility indicated that the age of maximum activity lies between 30 and 50; and although Minneapolis is a city of young workers, the investigation found some men of 65 and over in office positions.

The lower grades of office work are subject to the fluctuation of a seasonal trade, though they certainly are not considered to be such. Addressing envelopes on the typewriter, folding and mailing advertising matter, comptometer work on invoices, and substituting for stenographers in the summer-vacation periods are temporary jobs which require in a city of this size a large fringe of office workers, almost entirely girls, who are not regularly employed and who may be called upon at almost any time for short periods of service. The

¹ Commercial Work and Training for Girls, p. 265. Eaton & Stevens, Macmillan Co.

² The Public Schools and Women in Office Service, pp. 117, 118. Women's Educational and Industrial Union, Boston.

following report from an employment department in a typewriting company is significant:

Months.	Average number of positions filled monthly.	Average number of applicants monthly.
1913—November and December	52	123
1914—February and June	61	117
1914—October, November, and December	40	90
1915—April, May, and June	54	115

A second typewriter bureau reports that in January, 1915, 45 permanent positions were filled, as compared with 85 temporary places; and in July, 1915, 45 permanent places, as compared with 167 temporary places. It must not be forgotten that the same girls often register in several different bureaus and that consequently the applications overlap to some extent. Nevertheless, since every bureau reports more applications than positions, the statements may be regarded as fairly expressing the unemployment situation. The very fact that the work is temporary results in a low wage, except in substituting for stenographers.

The field of stenographic work is overcrowded, in the opinion of the heads of employment bureaus consulted. Except in summer, when there are many temporary positions open during the vacation periods, there are more applications for work than there are positions to be filled. But this oversupply exists only among inefficient workers. Those who have been trained and who are really competent are not long idle. The unemployables are found in every subdivision of office work; in stenography especially, but also in bookkeeping, and, to a less extent, in clerical work. Since women are rapidly taking possession of office work, it is they who form the largest part of this unemployed group. There are more boys seeking office work than are needed, especially those of the lowest grade, such as office boys, messengers, or clerical workers.

The cause of such overcrowding is, first, that office work attracts large numbers of boys and girls, because it is practically the only vocation which may be definitely trained for and because its conditions are generally good. Moreover, the activity of private commercial schools, whose life depends on their power to attract large numbers of students and whose solicitation is constant, is a great factor. Finally, there are indications that the number of positions increases less rapidly than the number of workers.

Reports received from 15 banks in Minneapolis show that in 1913-14 and 1914-15 320 left their positions and 385 were employed. The majority of these changes were in the positions of clerks, messengers, bookkeepers, stenographers, and miscellaneous workers.

This fact indicates that although there is a good deal of shifting among bank employees, the number of positions to be filled increases only slightly. Any reduction of overcrowding in this field means a general raising of the standard of office work, in which school, worker, and employer must cooperate, good wages being exchanged for ability and efficient training. Employment bureaus that refuse to place the inefficient may help to better the conditions.

The source of supply of new office workers in Minneapolis is in the schools, the grade schools for subordinate positions and the public and private business schools for more skilled operations. Every year about 3,400 students are graduated from these schools to enter upon wage earning. Employers in the group of firms studied use various means of obtaining office employees, as follows: 28, employment bureaus and typewriter companies; 4, commercial schools; 20, advertising; 16, through their own employees, either by advancing people already in the business or by taking friends whom they recommend; 44, choosing from applicants who file employment applications directly with the firm.

The average period of employment varies with the firm and the kind of work. The greatest degree of change occurs with young people, either because they are trying to find positions into which they can fit or because they are restless and unsettled and lack application. It is not the positions requiring training that so fail to hold, but the subordinate tasks where neither responsibility nor salary constitutes sufficient inducement for the average young worker. A study made in Cleveland of girls who entered office work with high school education and special training and those who entered without such equipment shows that the shifting of positions is most marked in the latter group.

SUMMARY OF FINDINGS FROM THE FIELD STUDY OF OFFICE WORKERS.

Schools do not now pretend to keep in touch with even a small percentage of their graduates, nor do they keep records of the information gleaned from time to time. A study of the occupational experience of a large number of graduates of public and private business schools would be of great value to a survey of vocational education. In the brief time allotted to this investigation it was impossible to undertake such a task. In lieu of this, a number of graduates were personally visited for interview. As a test of the work of the schools this study of their graduates was necessarily inadequate, since the largest number from any school was 20 and the smallest was 1. As providing contact with the intimate problems of young workers, however, this study was suggestive and illuminating.

Six business schools and the five high schools are represented in this group of 97 workers interviewed. The names were chosen from the

school files as nearly as possible from the first or last five letters of the alphabet. Records of the interviews cover not only occupational history but the worker's point of view concerning his school and his work. Expressions of personal experience are the most valuable, though the facts about work are suggestive.

It was discovered that the 223 positions which had been held by both girls and boys in this group represented 20 different types of offices, and the largest numbers were found in retail, factory, wholesale, and such other companies as telephone, telegraph, and railroad. Also, that, although 22 kinds of office work are covered, the majority of boys and girls were found at stenography and its combinations with bookkeeping, clerical, and cashier work. Tabulation of the wage of these young people, covering 156 positions held by girls and 52 by boys, reinforces the truth of the wage table given earlier in this chapter. It shows that girls remain far behind boys in salary. Only one boy received less than \$7 a week. The great majority of girls, 83 per cent, received \$7 to \$15, inclusive, while 61 per cent of the boys received \$15 to \$31, inclusive. A boy earned the maximum salary, \$31, and three girls the minimum, \$5.

It is more difficult to ascertain the time required to earn a good salary, especially for boys. It would seem to depend partly on natural ability and partly on circumstances. Two boys, each at work six months, were earning \$8 and \$10, respectively. Three who had worked five years earned \$10, \$12, and \$18 a week, and three out of school one year earned salaries ranging from \$7 to \$31. Only two girls had been working five years or more, and 60 per cent of the whole group had worked from one to three years.

Measured by wages received, it would appear that schools which train young people for business accomplish a fairly constructive piece of work. The vast majority of graduates earn a living wage and many of them much more. This is partly due, no doubt, to the fact that they have had more general education than the rank and file of commercial workers. Only four of the 97 interviewed had left school at the eighth grade, the remaining 93 having some high school education, and a number having spent a year or two in the university. The records are suggestive of the definite money value of general education, especially to the average worker.

Young people seem to find positions mainly by their own efforts or through friends. Of 149 who reported methods, 15 per cent reported positions found by the school, 8 per cent by "pay" employment bureaus, 16 per cent by typewriter companies, 8 per cent by advertising, 6 per cent through employers, 20 per cent by personal application of the workers, and 25 per cent by friends and relatives. If this is typical, it seems to point the need of an employment center for graduates of vocational schools which would be a real exchange,

serving employer and worker in the broadest and most discriminating way.

More significant than these facts about conditions of office work are the comments on training and work experience which the interviews brought out. Many hints are contained which should be brought to the attention of employers and teachers. These two groups do not often find it possible to arrive at the point of view of the young person, whose problems are as real and significant to him as are those of efficiency and classroom recitation to his superiors. An interview with one girl is given here as typical of the kind of difficulty a young person has in school and work, although the power of analysis shown is most unusual.

Miss C. thinks the course she took in high school was generally wasteful of both time and energy. English and history, subjects which she might have liked if differently presented, were difficult for her, because they were taught in routine fashion with no attempt to connect them with the present or future of the young person at school. "It was dead stuff," she says. The poetry course was hard for her, and when she expressed to the instructor the difficulty she experienced, she was asked, "What don't you understand about it?" "Of course, if I could have told her that, I would have understood the poetry," Miss C. comments. Again and again she was on the point of dropping out of high school, but her mother's question, "What would you do then, since you are not trained for anything?" made her decide to remain.

Her difficulty was with the cultural subjects. She loved practical work, but the effort to carry both, and to scramble through the subjects which she hated, resulted, she thinks, in destroying her power of application. "In order to get through the course," she says, "I had to work hardest on the general subjects and let go the practical subjects which I liked. If I could have concentrated on stenography, I would have become expert because I liked it so much, but, as it was, I spent most of my time on English literature and history and now I will never be a really good stenographer."

Since it was to become a stenographer that she took the commercial course, she regards her training with some bitterness. She believes the business course in high school should be much more intensive. The academic subjects that she liked immensely were economics and commercial law, which gave the only real conception of business that she has. Her bookkeeping was too detailed for practical use. If she could have had in the last year such practical problems as figuring freight rates and if she could have acquired methods of getting information on business matters, she believes her wage-earning capacity would be much greater.

"I didn't dare take a place where they demanded expert work," she says, "so I took a position at first with a lawyer who was a cheap affair. He had a typewriter whose keys used to unhitch every time I tried to speed up. Nothing was efficient about the office, although the work was interesting." Her next place was in a factory office as biller. Work was tiresome and exacting. It was a tradition in the company that no one had much opportunity to advance and that good salaries were definitely limited. "This discourages a person more than anything else. One doesn't feel interested or like giving one's best if one knows that advancement is limited." Nevertheless, from billing she was promoted to stenography, of which she says:

"The dictation I had was very difficult, full of technical terms which I didn't understand. If I could have seen the things themselves about which I

was always writing, I could have made some sense of my notes. I wanted to go over the factory and look at every part of the product. I said so, too, but there was never any time. Hours in the day were very long and at noon there was no one there to show us around and explain. But it would certainly have made it lots more interesting if we could have seen what we were writing about. When we were not busy we were not allowed to do anything, not even read the advertising material of the company. We just had to sit idle, and I don't think it is a good thing. It didn't make us contented.

"If I had it to do over, I think I wouldn't go into office work. I don't believe I will ever be an expert in stenography. I like something active. I chose it because it seemed the only high school course that would fit me definitely to earn my living. If I only could get work in a place where I had more responsibility and less routine, I would be so much less discouraged. I certainly would appreciate a chance like that."

This interview brings out some salient features of the question of commercial work as a vocation; first, in regard to public commercial schools, which, as the survey report indicates, must provide a practical, unified course, that will give not only technical training but a vision of business, broad, interesting, and applicable to the young person's experience. What this girl with her practical turn of mind longed for was to see the relation of textbook stuff and reality. When schools satisfy this desire while giving information and sharpening mental tools, they will have arrived at sound education. This girl's experience shows again the need of an employment exchange prepared to place young people in the kind of work for which they are best fitted, to prevent waste of energy, time, and money.

In contrast to this clear-cut statement are interviews with two groups of girls, one in the office of a telephone company and the other in a mail-order house. Though wages average only \$8 to \$12 a week and the opportunity to advance is small, without exception the girls seem to think that they chose their vocation wisely and are satisfied and contented. About their training they have no comment of any value. It may be that these girls, fairly intelligent and able to perform the tasks required of them, represent a large body of workers who are inherently adapted to routine work and not capable of much initiative. What the school may do for such girls besides giving them good technical preparation for wage earning is to open their minds and touch their imaginations to a sense of living outside their narrow groove of work. The employer may insure them good conditions, fair wages which leave a margin for recreation, and a working-day so short that they may have some use of daylight.

Another story is told by a girl who has arrived at an excellent position through her own efforts.

This girl, who is doing the executive work of buying material for her company and whose salary at the age of 21 is \$110 a month, is, nevertheless, doubtful whether she can recommend office work as a vocation. She started

as a stenographer and believes she was not sufficiently trained, since she found great difficulty at first in taking dictation. The routine that characterized all her work the first year was a very great burden; she had to force herself to do it. That she did it well is evidenced by the steady rise in her salary. She believes her success has been more difficult than if she were a man, because she had to carry so much routine as well as fill an executive place, and worked so hard that she feels quite old already. She believes she would have been aided by more thorough training in mathematics and might have found her work less difficult if her business technique had been better to begin with.

With their greater aggressiveness the boys have reached more varied lines of work, and they are being paid more than are the girls. Some feel that they are not prepared for their work because of weakness in stenography or lack of confidence.

Though many of the boys are inclined to think they have chosen their vocation unwisely, practically all say that office work is a stepping stone to other kinds of activity. Most of them seem ambitious and eager to get into advanced positions. Some have already been advanced to selling and soliciting, and to assisting the manager. Their comments about training are varied. General expressions of approval are given with a good deal of discrimination, accompanied by suggestions for changes that are not without significance on the basis of the experience and work of these boys. Two representative interviews may be quoted here.

Mr. B thinks he chose his vocation unwisely and would not recommend it, since in his opinion opportunities for advancement are not good, and in any large office there are too many ahead of the new worker. As for his training, he felt well prepared for office work and was not put through a probation period. He regrets not having finished high school and wishes that the private school he attended had afforded more training on office machines.

Mr. C thinks he chose wisely, and recommends office work, since in his opinion possibilities for advancement are good for an ambitious, energetic man. He has a good deal of routine work, but does not consider this a hardship, as office work is an opening wedge into other kinds of business. He believes that a young person entering an office needs well-defined business training and an academic education. He says that application blanks which he has filled out in seeking positions put great stress on practical business experience and training. He believes that business law and economics are much needed, but drill in English and the power to think something out have as truly a vocational value as stenography and bookkeeping.

What the interviews show is the way boys, as compared with girls, apply their training and the greater value boys are likely to find in extension courses in subjects related to their work. Boys make use of technical preparation for office work as a stepping stone to salesmanship, soliciting, stock work, banking, buying, assisting managers, and other special work. In general girls are more likely to remain at the technical work at which they start.

Boys and girls are being trained alike for very different business experience; and on the basis of present knowledge this is the wisest

course. Girls, however, should be stimulated to a greater professional spirit, so that from the field of technical work, now so largely theirs, the most efficient and talented may progress to special and executive positions. Employers must cooperate with the effort of the schools to inculcate such a spirit by giving equal opportunity to express individual ability and equal pay for equal work.

TRAINING FOR ADVANCEMENT AND FOR POSITIONS OF RESPONSIBILITY IN COMMERCIAL WORK.

There are two important phases of any study of a special vocation in its relation to education; one is the previous training preparatory for work, the other the training supplementary to work which fits the employee for advancement. The problem of commercial education has been discussed in other chapters. The possibility of training for advancement remains to be considered.

There are positions in the large business office which correspond to those of foreman in a shop, floorwalker in a salesroom, head miller in a flour industry, to all of which the survey has applied the term "noncommissioned officers."

The noncommissioned officer in the commercial office may be defined as a worker who has advanced beyond routine positions but who still works under authority. He holds a position of responsibility without possessing final authority. He superintends and outlines work for subordinates, but his plans can not include any sweeping change without the approval of superiors. He passes on a hundred matters, but must make statements of his decisions to those higher up. He is, in short, a "king pin" in the wheel, but not the motive force which drives it.

From a study of 23 types of offices and from interviews with business men the following list of such positions has been made:

MEN.

Office manager.
Credit manager.
Assistant treasurer.
Head of employment department.
Head of sales department.
Head of foreign exchange.
Assistant in auditing department.
Assistant cashier.
Head of general ledger.
Advertising manager.
Company secretary.
Department head.
Assistant bookkeeper.
Traffic manager.
Paymaster.

Assistant auditor.
In charge of shortage.
Cost accountant.
Teller, cashier.
Pay-roll head.
Purchasing head.
Adjustment clerk.

WOMEN.

Mortgage clerk.
Head of employment.
Head of stenographic work.
Head of office.
Credit manager.
Company secretary.
Teller.

Since office work is not organized, a discussion representative of the occupation as a whole covering the standards required was not possible. Conference meetings were held with representatives of different types of offices to determine how responsible positions had been reached and what definite training could be offered to fit workers for promotion. These interviews, in picturing the way actual promotion came, indicated that the unusual person always advances regardless of what his training has been, and that it is almost impossible to foretell the occupational experience of men or women, no matter what special preparation they may have had.

At a meeting of representatives of the Advertising Forum, all of whom held high positions in the advertising field, the fact was brought out that not one had had any direct training for the advertising business. Three had been trained for engineering, two had had legal training, two had been engaged in bookkeeping and management, and two had been newspaper men.

In the same way a meeting with a group of men of advanced positions in banks brought out the fact that their promotion had been due to individual initiative and ability. One began wage earning as a telegraph operator, another as a bootblack, and two others entered banking work with no definite training in that direction. In another miscellaneous group of business men only 2 out of 10 had been definitely trained for the work they were doing.

From a group directly representative of office men, however, testimony was offered that commercial training had been directly applied to work and had proved very valuable. The same evidence was given by a group of eight business women, six of whom had been trained for the business in which they were engaged.

Analysis of these human documents shows that in Minneapolis the hard-and-fast crystallization of business conditions has not manifested itself as it has in older communities. One would, however, be learning little indeed from other cities if one did not face the fact that the tendency is toward close-knit business organization where change from one position to another is difficult.

Though it is true that heretofore there has been ample opportunity for men and women with ability and capacity for hard work to advance to positions of power, whether or not they had special training, yet the stories told indicate that those who had a business education by no means wasted it, but found it useful either as an opening wedge or for advancement. The tendency carefully to consider educational assets in employing new workers was suggested many times in interviews with employment superintendents.

Whenever a close analysis of the requirements of a particular business was obtained from employers, it was found that definite training in commercial work either is essential for promotion or accelerates

it. Since this study has discovered more than 100 positions in business offices, the majority of which require no technical training, it must be true that many workers, especially boys, go into business without special preparation, and the question of some form of training supplementary to employment experience becomes more than ever important.

Suggestions were gathered concerning courses which the worker might find valuable in making a direct connection between theory and practice. The subjects outlined are as follows:

SUBJECTS SUGGESTED BY NONCOMMISSIONED OFFICERS.

Bookkeeping.

Commercial law.

Stenography.

Training in analysis.	{	Mathematics.
		English.
		Preparing forms.

Organization and methods of business.

Advertising.

Cost accounting.

Knowledge of traffic geography.	{	Railroad lines.
		Freight rates.

Local industries.

How to employ men.

Salesmanship.

Extension training in commercial work is now offered by the State University, the public schools, and the Y. M. C. A. Since this is considered at length elsewhere, only a summary is given here.

The report of the public schools for last year shows that there were four classes in shorthand, four in bookkeeping, one (in four groups) in typewriting, and one in salesmanship and advertising. The State University offers instruction in commercial law, practical English, accounting, economics, salesmanship, and advertising. The Y. M. C. A. gives courses which include salesmanship, character analysis, credit management, personal efficiency, bookkeeping, stenography, business law, estimating, mathematics, penmanship, business English, and business extension.

It would seem that greater effort should be made by the public schools and the university to bring these courses to the attention of young people already employed. There should be greater effort on the part of employers to encourage young people to take courses which will fit them for promotion. Such an effort is certainly being made by the banks, whose related organization, the American Institute of Banking, does everything in its power to promote interest in extension courses. The men whom we term "noncommissioned officers" should have an opportunity to take such courses in cost estimating, accounting, or commercial law as will help them better to

fill their positions, while they themselves should be training understudies to fill their positions in the future. Since this is experimental work, ideas and comment from business men are needed for the establishment of practical courses.

A rudimentary analysis of instruction valuable for advancement has been offered here, but it is only suggestive of what should be done completely and consistently by organized effort. The university and public schools wish to cooperate in extending business training and will avail themselves of definite suggestions as to the courses generally needed to promote successful business careers.

CONCLUSIONS FROM THE VOCATIONAL STUDY.

In concluding this study of offices, schools, records of individual experience and interviews with employers, a summary may be given of the best preparation for boys and girls for the vocation of office work.

Since the committee can not attempt here to go back of the high school to suggest fundamental changes in elementary schools, nor back still further to a discussion of the best home environment for children, it can only emphasize in this report, first and foremost, the advantage to the worker of as much general education of a practical kind as he can afford to get.

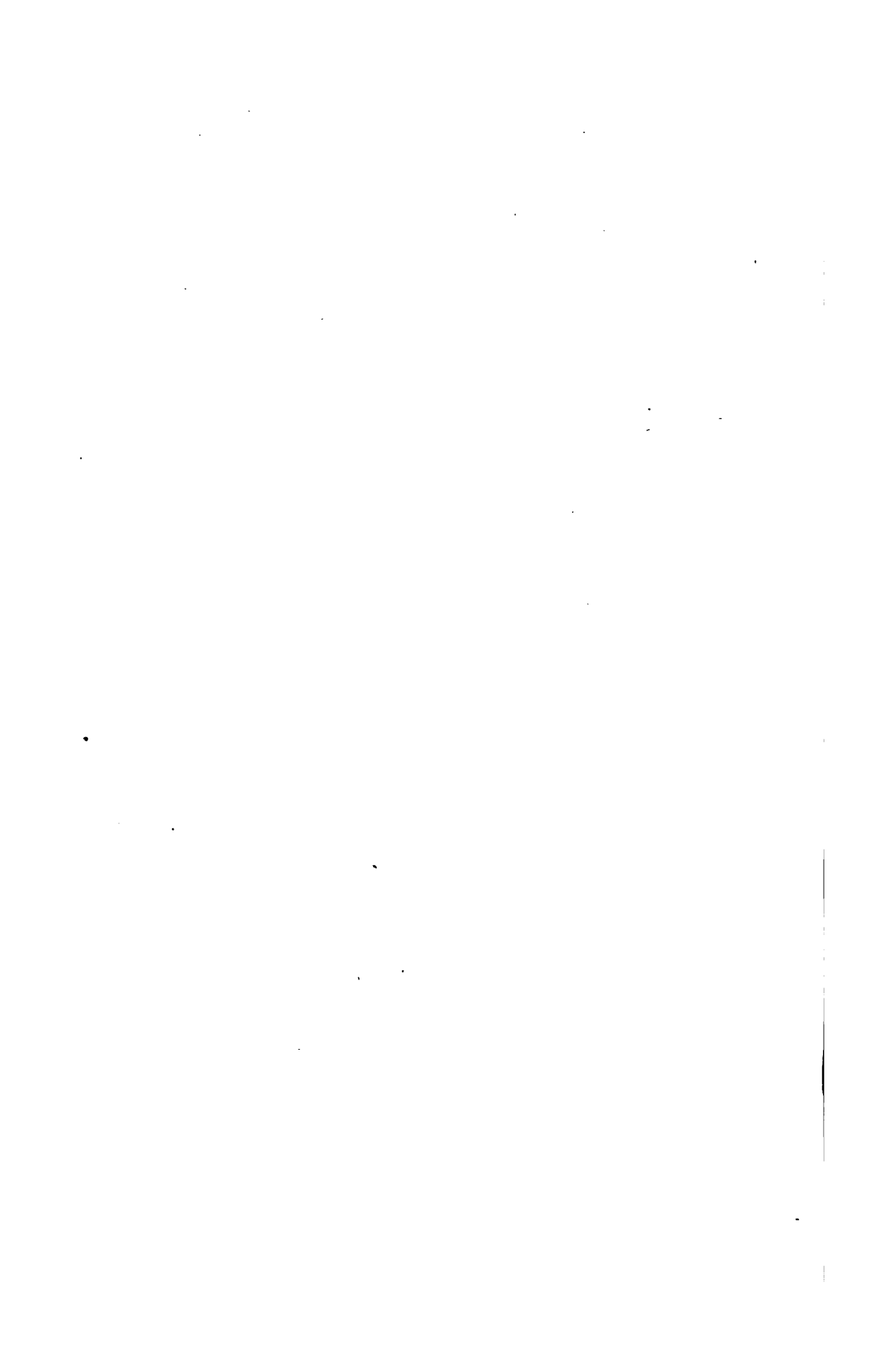
The advantage of education is the acquisition of power. If a boy can go four years to high school and then specialize in commercial training, so much the better for him, and the time is coming when the demand for such a one-year post-graduate course would justify the public schools in its introduction. If he can take two years of general education and two years of special training, it will be better than any less time spent in school. Evidence has been offered all through this report showing that two years of definite preparation for wage earning are so much better than none at all, that the schools should at once introduce such short courses to meet the present demand for them. Education pays. Special training pays. The majority of office employees feel that the character of their work is so largely special that the most progressive school can not do more for them than offer commercial training which covers the common features of office work and develops in the individual the power to make for himself the adjustments required by the particular office.

Two essentials for success, crystallized from the solution of all the interviews with nearly 100 employers, are accuracy and the power of analysis. Accuracy in the technical work of stenography, bookkeeping, copying, filing, and receiving and executing orders is needed in every company and by every business worker.

Ability to analyze the day's work in order to reduce it to system, to analyze expense reports so that they may be charged correctly, or figures to appreciate their significance, or the work of the department that it may be carried on with the smoothest economy, is the common quality which makes for advancement.

Accuracy and to some extent the power of analysis may be acquired through a preparatory course, but after actual work has begun this latter power can be increased tenfold through extension courses, which give definite methods of analyzing cost sales and systems of efficiency.

The best preparation for this vocation is therefore general education plus intensive training plus advanced extension courses taken in connection with actual employment. The professional man or woman knows that education and training are lifelong, and to raise business out of mere routine to the standard of a profession every possible means of continuing training with practice should be provided by constant cooperation of school, employer, and worker.



CHAPTER XXII.

WHAT VOCATIONAL EDUCATION IS NEEDED FOR HOME WORKERS?

This study was made under the auspices of a committee appointed for the purpose while the survey was in progress. The committee, whose membership is given in Appendix A, was made up of women representing various interests and points of view, such as the public schools, the Instructive Visiting Nurses' Committee, the Woman's Club, and the College Women's Club. A specialist in home economics of the university agricultural extension division had charge of the work, and made the report which follows. In the field work she was assisted by students of the home economics department of the College of Agriculture, who gave their services as volunteer workers, and whose names are given in Appendix A.

Peculiar conditions attend an investigation of work in the home. The work in the average home occupies the time of only one or two persons. In most industries a unit of production employs a number of workers, and an investigation of that unit gives facts concerning a group of people. Thus a given amount of time and energy gives returns for a much larger number in a study of work outside the home than in a study of work within it.

However, work in the home is organized along such similar lines, as compared with other industries, that returns for a small number may be considered typical. The questions touch upon the most intimate problems, and it is more difficult to obtain frank answers than in a study of business organizations.

The study was divided into two parts: First, a brief investigation of training already offered in the city; and, second, an investigation of groups of typical homes to determine prevailing conditions, previous training, and the desire on the part of the workers for instruction in household duties.

Evening courses have been offered in cooking and sewing in both elementary and high schools. The cooking classes had a total enrollment of 377 and an average attendance of 39 per cent. Of the persons enrolled, 77 were engaged in housework or as waitresses, the remainder, with the exception of those whose occupations were "not stated," being persons who worked at other professions during the day. Thirty-two evening classes in domestic art, millinery,

sewing, dressmaking, and art needlework were held, with a total enrollment of 612 and an average attendance of 31 per cent. Of these, 147 were engaged in housework or as waitresses, the remainder being persons employed during the day in other kinds of work. One class of 10 pupils for household employees was held at the Girls' Vocational High School.

The Young Women's Christian Association has held classes of this kind for more than 20 years. These are made up of housekeepers, prospective housekeepers, and household employees. There are classes in cooking, serving, sewing, dressmaking, millinery, embroidery, and home nursing, and any woman or girl over 15 may be admitted. A tuition fee is charged and the pupil must pay in addition \$1 for membership in the organization. Wells Memorial House offers courses for nursing mothers and in sewing and cooking. Northeast Neighborhood House offers courses in cooking and sewing, and similar courses are offered in other settlement houses. The Infant Welfare Society holds clinics and gives lectures in the settlement houses, and the visiting nurses have given two-year courses of lectures at the Y. W. C. A.

In the organization of the investigation to determine the demand for courses in home work it was found convenient to group the homes of the city into three general classes: First, those where the household labor is done by paid employees and the mistress of the home acts as manager and organizer; second, those in which the work is organized and performed by members of the family, but where comfort and often luxury exists; third, those which are on the verge of bare existence—where the house mother often works outside the home all day and the children do the work, and where, in many cases, the home is under the general supervision of social and charitable organizations. For each type a special questionnaire was prepared.

A STUDY OF HOMES HAVING PAID EMPLOYEES.

This problem was studied in three ways: First, advertisements for household help as found in the daily papers for a period of two months; second, questionnaires sent out to women employing household workers; third, questionnaires presented to household employees themselves.

A study of advertisements covering 47 days was made in September and October, 1914. These months were chosen because people are then returning from their vacations and organizing their homes for the winter. The following points were considered: Average number of advertisements a day, kind of help wanted, qualifications, and references required. While the returns as to qualifications and refer-

ences were too diverse to be valuable for tabulation, the following results were obtained as to the other points:

TABLE 21.—NUMBER OF ADVERTISEMENTS IN MINNEAPOLIS DAILY PAPERS FOR HOUSEHOLD HELP, BY KIND OF HELP WANTED, 47 DAYS IN SEPTEMBER AND OCTOBER, 1914.

Kind of help wanted.	Total.	Average.
General houseworker.....	1,584	24
Second worker.....	52	1
Assistant with housework.....	206	4
Cook.....	84	2
Housemaid.....	13	
Washerwoman.....	6	
Janitor.....	2	
Sewing woman.....	1	
Housekeeper.....	118	3
Nursemaid.....	85	2
Waitress.....	14	
Companion.....	4	
Governess.....	1	
Dishwasher.....	13	
Total.....	2,183	46

The attitude of the employer toward the question of giving short-unit courses for the employed worker in the home was investigated through a questionnaire.

Some of these questionnaires were distributed through the College Women's Club and among personal friends of the field workers, but the returns were largely from employers who had obtained their workers through the home-service bureau of the Woman's Club of Minneapolis. This does not indicate that they were members of the club. The home-service bureau is a general employment agency, aiming to place only employees of a good type, but reaching as general and representative a class of patrons as any other agency of good standing. The questionnaires sent to a miscellaneous list of its patrons may be taken as representative.

The following data were obtained from the 74 questionnaires returned.¹ In the homes employing household workers in Minneapolis there is an average of $1\frac{1}{2}$ workers to a home, receiving an average weekly wage of \$6.27, which ranges from \$4 to \$6.50. The conditions as to hours of work differ from those in other industries, as in only 1 home in 100 are the hours fixed, while in 80 the girls are expected to work any number of hours, the requirement being that the work shall be finished, however long it may take to get it done. In most of the homes there is a reward, however, for extra work, 18 in 100 giving this reward in the form of money and 11 as extra time off. Only 20 per cent give no reward at all. In the matter of free time, during the 7 days of the week the household employee has to

¹ All returns are figured to give statistics on the basis of 100 homes. Fractions are not used. Anything one-half or more is considered as the next highest whole number; anything less than one-half is dropped.

herself an average of 1.66 half days and 3 evenings, as against the entire Sunday, the 7 evenings, and often Saturday afternoon of the worker in the business world.

The methods of getting household employees vary. In the group studied, 25 in 100 obtained them by advertising, 26 through employment agencies, 54 by personal recommendation of other employers or employees, and 8 by application. (The discrepancy in numbers occurs because some women obtained help through all these.)

The qualifications for household employees which employers consider desirable are many and varied. Of those replying, 64 in 100 desired neatness, 48 honesty, 30 willingness, 22 good health, 20 pleasant disposition, 18 competence, 18 ability to cook, 15 good morals, 10 intelligence, 9 experience, 7 ability to do laundry work, 7 ability to speak English, 5 ability to take telephone messages. Other qualities mentioned were "economical," "interested," "responsible," "prompt," "sane," "respectful," "not American," "good manners."

Among the answers to the question, "What are the qualifications you insist upon, if any, in selecting employees?" were such as these:

Shall understand her work; in other words, be what she calls experienced.

Shall have a reference, or satisfy me that she has held other positions for a length of time.

Shall be respectful at all times.

Shall be clean and healthy.

Seem straight.

Can think for herself so that I shall not have to do all the thinking and planning, and is kind to my children.

Shall be intelligent.

Disposition, appearance, neatness; will take responsibility and has ability. Method of doing work does not bother me so long as results are good. I expect the best that is in a girl and I get it.

I don't insist upon anything but intelligence, and a willingness to learn. Present maid I have is intelligent and clean. She expects to be married soon but successfully resists all my efforts to teach her cooking. Is very indifferent on that subject.

Neatness, honesty, fair knowledge of cooking. As there is no standard, usually judge by appearance of applicant and past record if obtainable. Difficult to insist on any special qualifications.

Information regarding employee's previous training in household work was gained through the question, "Have your employees had any previous training in household work, or did they gain all their training in homes?" Replies showed that only a few had had any training other than that received in the home—either their own or the homes where they were employed; 81 out of 100 received their training in homes; 8 had some school training; 1 had been trained by her uncle, a butler; 3 had received some training in the old country; and 7 had received no training at all.

The question, "What training have your employees had in such subjects as sanitation, taste in home furnishings and home arrangements, cooking, elementary sewing, care of the sick, and so forth?" was unanswered in many cases. From the answers received, 50 in 100 had had no training; 5 had had experience (subject not mentioned); 3 had had some training in nursing; 4 in cooking; 1 in sanitation; 1 in serving; 1 in sewing; 1 in laundry; and 1 had attended night school (subjects not mentioned).

The attitude toward training was studied. The question, "Would your employees be interested or willing to take such courses?" brought a more general response. On the basis of 100 families, 25 answered "Yes," 13 "Possibly," 10 "Do not know," 9 "Probably not," 3 "Seldom," 18 "No," and 22 did not answer.

This was followed by three questions to ascertain the employer's attitude. To the question, "Would you favor such courses?" 82 in 100 answered "Yes," 4 "No," and 14 did not answer. The question, "If they took such courses and became better workers, would you be willing to pay them more money, and how much?" was answered as follows: 30 in 100 answered "Yes," 34 answered "No," 4 answered "Possibly," 3 answered vaguely, and 20 did not answer. To the question, "If they took these courses, would you be willing to allow them extra time—say, about two hours a week—or would you be willing to allow them half of it, leaving the girl to give the remaining time out of her time off from your home?" 41 in 100 said they would allow part or all of the time, without stating a preference for afternoon or evening; 14 would allow time off in the evening; 1 in the afternoon; 7 either afternoon or evening; 4 would allow no time; and 33 did not answer.

An idea of the general trend of the answers can perhaps best be given by excerpts from the returned questionnaires. To the question, "What training have your employees had in such subjects as sanitation, taste in home furnishings and home arrangements, cooking, elementary sewing, care of the sick, and so forth?" the following were given: "Not any specific, except that I take the responsibility of teaching my maids plain sewing and as many of the subjects named as they care to learn." "I taught my maid a little about sewing and later sent her to night school."

These questions were asked: (a) "Would your employees be interested or willing to take such courses?" (b) "If they took these courses, and became better workers, would you be willing to pay them more money, and how much?" Some replies follow:

(a) I can not determine. (b) Yes; could not say amount until I saw results.

(a) I think not. (b) As I believe that housemaids do not possess a knowledge of their business which at all fits them to carry any responsibility in the home,

I can not say "yes" to this question conscientiously. Of course I should have to "do as others do" if I wanted to keep a maid. Of course, I speak of the average maid.

(a) I can not say. (b) Having suffered with the specialist, I prefer to take the newcomer and teach her myself.

(a) Yes; possibly. (b) I don't expect any personal benefit from my maids. Should not a maid be fairly trained, to demand \$6, \$7, \$8 a week?

The question, "Would you favor such courses?" was answered as follows: "I do not think that these courses, except cooking, would be very practical for housemaids." "Culturally, yes; for service, not especially." "Home training in cooking, sewing, and laundry. I would not care to have them trained in 'home furnishings, home arrangements, food values,' and the like, as either it would furnish the 'little knowledge that is a dangerous thing' or, were they more thoroughly informed, they would generally be rendered so conceited that their demeanor would be disagreeable to employers." "No; except cooking. Those things are the home maker's duties, not the employee's."

The question as to "the most common deficiencies of the employees you have had in your home" brought the following replies:

Do not know why they do things. Lack careful training.

Lack of interest and incentive, because the supply is not nearly equal to the demand, and they are not obliged to make good. I think this the root of our troubles with domestic servants.

Tendency to slight in cleaning. Tendency to stay out late nights. Only had one really dishonest and depraved. Most of them self-respecting women, teachable and courteous.

Lack of scientific training. No knowledge of principles. Haphazard knowledge. In cleaning, not thorough. In cooking, not exact. Hardest fault to overcome is breaking of dishes.

No idea that housekeeping is a profession to be proud of.

I find when doing my own work, though less experienced and strong than my maids, that I can accomplish the routine—dishwashing and the like—in less time.

The natural light-headedness of youth. One can not expect them to enjoy drudgery in some one else's kitchen while their whole soul yearns for what they consider a good time.

Replies were summarized as follows: Thirty-eight employers in 100 found their employees careless; 18 lacking in interest; 15 ignorant; 12 not neat; 12 poor cooks; 5 wasteful; and 4 incompetent. Some found them irresponsible, not adaptable, "grouchy," crude, disrespectful, and stupid. Others spoke of "lack of knowledge of values" and "failure to appreciate the dignity of housework."

It is interesting to note that these deficiencies correspond very closely with those listed by employers in the business world as determined by the survey in its investigations.

Definite conclusions from the returns are difficult to draw. It appears that by far the largest number of persons working as paid employees

in the home are doing "general housework." These apparently have had no training for housework save what they received in the various homes where employed. General housework employees receive \$4 to \$7 a week.

In considering the application of these facts to the problem of short-unit courses for employees in the home one is faced by two questions: First, if the employee should take these courses and become more skilled in her work, able to correlate its different parts, and should develop into a skilled cook and good general manager, could the average household pay her more than she now receives? Second, so long as the great demand is for the general houseworker, and untrained women command wages as high as can reasonably be expected, has the average houseworker sufficient incentive to put her time and energy into such courses?

To the first question most employers, except those now paying only \$4 or \$5 a week, must answer "No." To the second, a knowledge of human nature compels a negative answer also. This forces one to the conclusion that there would be no great interest in such courses except when an employee was promised higher wages in her present place; when she knew of openings in special work; when she was unusually conscientious; or when she had a special interest in her work, due, perhaps, to the prospect of marriage and a desire to learn to care for her own home.

The extent of training of household employees by employers was ascertained by the question, "Do you carry on in your home any systematic training of your employees?" To this 54 in 100 answered "Yes," 35 "No," and 11 left the question unanswered. These answers were misleading, as was shown by those to the next question, "If so, how do you do it?" which varied but little whether the previous answer had been "Yes" or "No." In nearly every case such training consisted of showing the employee how work was done in that particular home. The variation in answers to the first question was apparently due to the difference in stress upon the word "systematic." In only a few cases did the answer to the second question indicate really systematic training. This point is well illustrated by the following examples:

(a) Yes. (b) Have taught myself Swedish and have to teach them English, American cooking and my own method of housework. They usually are good workers.

(a) Yes. (b) Show them how I wish the work done and reasons for cleanliness, ventilation, and so forth. Help them plan their work. They can always get higher wages when they leave me.

(a) Yes. (b) Most of importance is regularity and systematic principles of household duties.

(a) No. (b) Show them how to do the work as I like it, and let them use their knowledge and judgment as far as possible.

(a) Yes. (b) Teach her about the cooking, cleaning, and so forth, and the principles of cooking. I took a course in cooking.

(a) No. (b) And yet I am always teaching them what I consider the best and easiest way to do all kinds of housework, but I allow them to do their own way when there is no objection.

(a) If necessary. (b) I employ only competent cooks. The young maid of whom I speak I have trained to do each thing, showing her how I wish it. In waiting on the table I had her sit down and showed her how I passed the things and removed the plates and placed others in their place.

(a) Somewhat. (b) By personal teaching and sometimes sending them to domestic science school.

An effort was made to get information from the paid worker in the home as to her need for training and her attitude toward the question of attending classes. A questionnaire was prepared for girls and women applying for positions to the employment bureau of the Woman's Club in September.

It was hoped to get a large number of replies from workers seeking positions for the winter but for several reasons which need not be considered here only 10 replies were obtained out of a possible 200. After the failure of this plan it was found impossible to get the desired information, as the period had passed during which large numbers of applicants were dealt with by the bureau. The study was unable to devise a satisfactory method of securing information from paid workers in the household, and is therefore unable to furnish any statistics from them.

The home-service bureau has made a constant effort to interest the girls in something that would make for self-improvement and greater efficiency. In the first months their attention was called to the courses given by the Young Women's Christian Association. As the fee for these courses is fairly large it was thought possible that the fee was one reason why no larger number entered the classes. In the winter of 1914-15 a free class was established at the Girls' Vocational High School. An effort was made to interest the girls by issuing invitations to an evening party. Out of 160 invited fewer than 50 attended. At the party this class was announced and a special effort was made to explain the courses and create an interest in them. A class of 10 girls was the result.

This would seem to have been the result of two things: First, the lack of incentive already referred to; second, the difficulties connected with attendance, owing to the irregularity of hours of work and to the fact that the girls are too tired by evening to make the effort to attend.

This part of the investigation would seem to indicate that so far as the employee is concerned any attempt to conduct short-unit courses for home workers would fail.

A STUDY OF THE HOME IN COMFORTABLE CIRCUMSTANCES BUT EMPLOYING NO PAID WORKER FOR FULL TIME.

Questionnaires for this study were sent out through the Parents' and Teachers' Associations, the Woman's Club, the College Women's Club, the faculty women of the College of Agriculture, and to some extent among the personal friends of the field workers. Seventy-two schedules were returned.

The universal interest in short courses for home workers was shown by the response to the question, "Would you be interested in short courses in any of the following lines?" The numbers answering in the affirmative are as follows:

Expenditure of income	42	Millinery	24
Home sanitation	25	Floriculture	14
Home nursing	38	Home gardening	26
Marketing	44	Home furnishing	26
Nutrition and diet	36	Serving	29
Foods and cooking	36	Care of children	29
Planning of meals	56	Kindergarten methods	14
Preparation of meals	40	Vocational guidance	21
Textiles	17		

When asked "Would you attend if 10 lessons in any of the above were offered in the public schools in your neighborhood?" 67 in 100 answered "Yes"; 12 "If possible"; 1 "Not regularly"; 11 "No"; and 9 left the question unanswered. Several of those who answered "No" added notes saying that it would be a splendid thing for young housekeepers, but that they would not care for it themselves because of their many years of experience.

Certain salient points stand out from these schedules. Most home workers, even those who are themselves performing the work of their homes, acquired what technical knowledge they possess through their own experience or that of their mothers and friends.

How the home worker learned household duties was learned from the question, "How did you learn to take care of a home and its duties?" Thirty-one in 100 learned from their mothers; 3 from their own experience alone; 27 from their mothers, their own experience, and the advice of friends; 5 by doing work as household employees; and 34 had had some school training. This school training was divided as follows: Eight had cooking in the public schools, 4 both cooking and sewing in the public schools, 3 short courses at the Young Women's Christian Association, 1 a short course in the Minneapolis Woman's Club, 4 short courses in cooking and 3 in sewing in other schools, 4 general courses in sewing in other schools, and 7 general courses in both cooking and sewing in other schools.

Probably the figures for these having special training are higher than the average, as the schedules were sent out through organiza-

tions, and the very fact of membership in these argues a progressive spirit in affairs relating to the home. The natural conservatism of women and the traditions of generations were indicated in one answer: "I think a woman of trained mind and any ambition does not need any lengthy course of instruction." (This woman, however, is interested in courses in home sanitation and gardening, and would attend courses of 10 lectures in these subjects.)

It is noteworthy that the women who expressed themselves most enthusiastically in favor of courses now offered, and who indicated a desire for a large proportion of the ones suggested, are those who have had some training—who have had a glimpse into the possibilities in this field, who realize the foundation of science and technical knowledge necessary to erect a superstructure of efficient home making instead of "rule-of-thumb" housekeeping.

The difficulties connected with the administration of such courses are indicated by the answers to questions regarding the time at which the lessons could be taken. Most of the answers indicated a combination of two or three days, but may be summarized as follows: Monday, 13; Tuesday, 7; Wednesday, 33; Thursday, 22; Friday, 18; Saturday, 0; middle of week, 3; last of week, 3; first of week, 3. The general conclusion may be drawn that Wednesday, Thursday, and Friday are the best days, in general.

Far more significant is the fact that day is preferred to night time. Twenty-eight desired morning classes, 29 afternoon, and only 13 evening classes. This raises a question as to the possibility of using public-school buildings if the demand for short-unit courses is to be met. Perhaps this accounts for the comparatively small number of household workers taking the evening courses in the public schools. Time and place undoubtedly would have to be settled for each small group. In the study of the day-school work in household arts in Chapter III it is shown that not only are many of the facilities used for only $4\frac{1}{2}$ hours a day, but at certain periods they are idle even while school is in session. It might be possible in the morning, certainly in the afternoon, to use these for the women who have indicated the preference for day classes.

It is interesting to note the type of instructor and method of instruction preferred. While 51 expressed a desire for a practical and experienced teacher, only 11 spoke of the necessity of technical training. Possibly many took for granted that no teacher would be put in charge of the work who lacked training, but it emphasized the fact that the woman with training but without actual experience finds it difficult to gain the confidence of the practicing housekeeper. The question as to method was, "What, in your estimation, would be the best way to present these courses—lecture, demonstration, or laboratory?" Seven advocated lectures; 6 a combination of lecture and

demonstration; 1 lecture and laboratory; 11 demonstration and laboratory; and 15 the use of all three.

The question of a consulting bureau where advice can be obtained free of charge, or for a small fee, presented to the housewives an idea that probably never has been worked out in exactly this form. It has been tried in a somewhat impersonal way by magazines and newspapers, but women have not been able to go to a woman who has had the best technical training available, who is experienced, sympathetic, adaptable, tactful, and endowed with a very unusual amount of common sense. A bureau of this kind would perform valuable community service.

That such a bureau would meet a real need was shown by the responses received. Thirty-six desired the opportunity to consult regarding "individual financial problems, as keeping household accounts, planning expenditures, readjusting expenditures"; 49 on general questions of marketing, as "seasonable articles, where they can be obtained, and prevailing prices"; 44 desired help in "obtaining satisfactory service"; 31 in "home education of children"; and 47 in "general home problems."

To the question, "Are you interested in budget making and accounting?" 63 in 100 answered "yes"; 12 "no"; and 25 left the question unanswered. This was followed by, "If such courses were given, would you attend?" The response was much more enthusiastic than the committee had dared hope. Thirty-seven answered "yes"; 5 "if possible"; 3 "doubtful"; 32 did not answer; and only 23 answered unequivocally "no." These replies were most gratifying for they indicated that intelligent, progressive women were beginning to realize the fact that the making of a home is a business, and that to put this business on a sound basis the question of expenditure of income must be systematically studied and not handled in the haphazard way customary in the past.

The household budget and accounting and its relation to the efficient management of the home is becoming an increasingly important topic.

A STUDY OF THE DEPENDENT HOME.

The third questionnaire was taken into more or less "dependent" homes and the returns gathered by personal visit. Entrance to the homes was gained through the Infant Welfare Society, the visiting nurses, the visiting housekeeper of the Associated Charities, and various settlement houses. Of the 93 questionnaires returned, 24 were discarded because of lack of information regarding the definite demand for courses. This lack was attributed to the fact that in certain sections of the city there exists a feeling of suspicion toward the casual visitor. The social workers gave every aid possible

through their histories of the homes considered, but where personal visit would in any degree jeopardize the work of the regular visitor it was not attempted. This left a total of 69, which were gathered in various parts of the city, and may be taken as typical of the attitude prevailing in this type of home.

The study of the training of the mother showed that in these homes the average age of the mother at marriage was 20 years. Assuming that the replies of the 69 furnish a practical base for the type, 68 in 100 of these women learned all or nearly all they knew about household duties from their mothers; 14 gained some knowledge by working as household employees before marriage; and 17 had had some work along these lines in school.

Eighty-eight out of one hundred do their buying at the small local grocery and in many cases most of the buying is done by the children. This is one reason why some families are in their present condition economically. A few buy food supplies at the public market, and a few buy staple supplies at large stores and in large quantities, thus getting better prices, but most of them buy from day to day or from meal to meal, and so spend an exorbitant amount for food supplies. Ninety in one hundred buy some ready-made clothing, and 78 make clothing at home; thus most of the families use both methods, buying coats and other outside garments ready-made, but making their other clothing. In a few cases all clothing is purchased ready-made.

Eighty-six out of one hundred families buy their food supplies as raw materials and prepare them at home; 32 buy some food prepared, but most of these buy only bread or occasionally prepared food in hot weather. In a very few cases all the food is bought prepared; one field worker found a family in which three children bought the food for each meal according to their own desires, often having a meal made up entirely of pie, cake, and cookies. Five of the children of this family have been put into a State home, because of the incompetence of the mother, a woman who can read and speak three languages.

The small number of homes in which the food is purchased prepared will surprise persons who make the off-hand assertion that the majority of American families buy at least their bread. In this connection it is interesting to recall the statement of the master bakers that if Minneapolis housewives stopped baking bread at home the number of bakeries would have to be tripled.

Interest in the affairs of the home and a desire for better conditions is shown by the demand for various short courses. Desire for these was expressed in the following proportion:

Family expenditures	7	Sewing	48
Home care of sick	17	Cutting and fitting	43
Foods and cookery	25	Millinery	12
Planning meals	12	Home gardening	1

The general interest and the demand for specific courses varied widely with the section of the city. In the poorest section it would be hopeless to attempt courses such as might be given elsewhere. In sections where the mothers do day work, they have neither time nor strength to take such courses themselves, but in many cases they expressed a desire that the courses be given for their children.

The need of special effort to reach these homes is indicated by the replies to the question, "Have you ever heard of any such short courses being offered for home workers?" Twenty-six per cent did not answer; 16 per cent replied in the affirmative; and 58 per cent said they had not known of any work of the kind. This shows that special methods must be used to reach these homes, which surely have a greater need of such instruction than those of the more advanced types.

The unanimity of opinion among social workers as to the need of these courses and their possibilities is very striking. More than anyone else they realize the difficulties to be overcome. Two facts stand out regarding such work. The first is that many social centers have already organized groups of people who are anxious for help in their home work. This instruction has been given largely by volunteers. As the instructors often were inexperienced and changed frequently, the work was not of uniform standard and at times it was impossible to obtain instructors. Probably these groups already organized by people who know them and in whom they have confidence would form the best starting point for the work. The second thing that stands out is that, almost without exception, social workers emphasize the fact that success depends entirely upon the instructor. She should be a trained woman, sympathetic, adaptable, practical, and of sufficient maturity and experience to gain the confidence of her class.

SUMMARY OF STUDY, AND CONCLUSIONS AND RECOMMENDATIONS OF SPECIAL COMMITTEE ON HOME WORKERS.

The committee on the training of home workers, under whose auspices the foregoing study was made, approved the report of the study in the form in which it has just been presented and of the summary and conclusions which follow:

Only about one out of every five home workers has been trained in any of the household arts. There are in Minneapolis to-day 66,042 homes. In each of these homes there is at least one person upon whom devolves the duty of caring for that home. If one applies the coefficients obtained in the foregoing questionnaires as to preliminary training for this profession, only 12,988 out of the 66,042 had any training whatever, except what they got "on the job"; that is, working either in their own homes or in the homes of other people.

This is true partly because of the tradition that the work of the home can be best learned through training and teaching given directly from mother to daughter and partly because systematic training in the work of the home has been available in schools only in the very recent years. Changing economic conditions, however, are making the question of vocational training for work in the home a vital one.

The average American home makes the largest demand for training—the type of home in which the work is done by the home maker herself, and so carries with it the real interest and love that goes with doing for one's own, and yet where there is enough latitude from the economic standpoint to place the home on a really efficient basis. The desire for instruction in these lines is shown by the amount of reading done, for it was found that whereas 57 out of every 100 homes of the third type read no books or magazines, in the second type of home 85 out of every 100 of the home makers read one or more magazines devoted largely to questions concerned with the home and its duties.

Short-unit courses for home workers would reach a good proportion of household workers. The varying returns from the homes of the first type would seem to show that these courses would not go far toward solving the vexing problem of household employees—that while training is eminently desirable (at least from the standpoint of the employer) conditions are such that sufficient incentive can not be offered to make it especially desirable from the standpoint of the employee, except in comparatively few cases. Such courses could probably be offered with considerable success in some parts of the city but would not meet with success as a general rule. For the workers in the third type of home certain courses could be offered and would be well attended if the matter were approached in the right way.

The social workers can do the most for the third type of home. From their home visitors, from visiting nurses, visiting housekeepers, and the infant-welfare nurses specific information as to the section of the city under consideration can be obtained. More important than this, these workers have the confidence of the people and can win their interest as strangers could not do. From them the most practical suggestions probably could be had as to effective methods of reaching the people and getting the groups together. In the preliminary investigation of work already done along these lines, nearly every organization approached indicated willingness to aid such work by advertising such courses, providing places of meeting, and, in case of the visiting nurses and Young Women's Christian Association, providing conductors of courses.

A "housekeeping center" is suggested by five of these organizations as one of the best ways of reaching the more conservative and

less intelligent parts of the city. This seems to be the only hope of accomplishing anything in the poorer sections. Here more than any other place the personality of the teacher and her tactfulness would seem important.

In two social centers in Chicago visited during the investigation this point was very forcibly illustrated. Both were in Italian districts. In one the statement was made that the only hope of influencing these homes lay in training the girls while small. National prejudice forbids women leaving the home after marriage or modifying their traditional methods of doing work. Hence the house-keeping center had been a failure.

In the other the classes were filled up to the capacity of the "model apartment" every day. The young woman in charge here illustrated her methods by her procedure in the cooking class. She found her "point of contact" in the national Italian dish, spaghetti with cheese and tomatoes. She then proceeded to substitute rice at 8 cents a pound for the spaghetti costing 10 cents a pound. The next step was to drop the cheese and tomatoes, giving a lesson using plain boiled rice. From this point she was able to proceed with a course of lessons in simple American cookery, wise buying of supplies, and the general lessons in care of a home, sanitation, etc., which could be given in an apartment exactly like the ones most of the class were living in, but furnished and cared for in the best possible manner.

Teachers will have to be chosen with the greatest care for class instruction also. Whatever type of workers they are to reach, in fact, the success of the whole plan will depend largely upon this one factor. Some of the characteristics emphasized by the social workers as being of special importance were training, a reasonable degree of maturity, tact, good judgment, practical knowledge, pleasing personality, interest in people, knowledge of conditions in the field, and "sympathy without sentimentality."

Vigorous advertising campaigns must be carried on if the courses are to be a success. The staid, dignified newspaper articles and cut and dried posters usually used in educational campaigns will need to be supplemented by more attractive methods. Probably striking announcements thrown upon the screens of the moving-picture theaters in the various parts of the city would reach more people these days than almost any other method. It is certain, however, that the advertising will be one of the most important features in the success or failure of these courses.

Special committees prepared outlines of courses of study in different subjects for workers engaged in the home, which were approved by the full committee on home workers and have been submitted to the public school authorities as a suggestive program of the things which, in the opinion of the committee, need to be taught in part-

time and evening classes. The limits of this report will not permit of the publication of these courses, which were worked out in great detail. They covered, besides other things, the following subjects:

A. Course in foods and cookery, including a study of the composition, cost, nutritive value, and preparation of different foods; planning of meals, serving, nutrition, and diet.

B. Courses in sewing and dressmaking, including instruction for beginners, children's clothing, shirt waists, dressmaking, and fine hand sewing; in millinery, including winter millinery, special millinery, spring and summer millinery.

C. Courses on the family clothing, how to buy and take care of it; courses on family spending; public health lectures, including care of the baby, care of the child, sanitation and ventilation, care of the eyes, care of the teeth, prevention of contagious diseases, tuberculosis, and the care of the child who has tuberculosis; courses on furnishings and decoration.

Practically all the courses which have been outlined as the result of the study described deal with what may be called the practical or mechanical side of the duties of the home worker. While the committee recognizes the need for these and the diplomacy of offering them first, it regards instruction in cooking and sewing, for example, as being only elementary and, therefore, preliminary to instruction in a wealth of even more important subjects, such as sanitation of home and neighborhood, furnishings and decoration of the home, budget making and household accounting, health and recreation, family and social relations, and the creation of a home atmosphere making for better personal and family well-being.

CHAPTER XXIII.

WHAT ARRANGEMENTS CAN BE MADE FOR COOPERATION BETWEEN THE SCHOOLS AND THE TRADES AND INDUSTRIES?

The establishment of a school or class giving preparation for any trade immediately raises the question of the relation of that institution to the trade as a source of supply for workers.

It was felt at the outset of the survey that, inasmuch as any plans for vocational education must adjust themselves to present conditions in industries, a study was necessary not only of the processes and demands of the industries and occupations but of the attitude and ideas of employer and employed regarding the training needed and the ways in which it could best be given.

This latter phase took the form of conferences with employers and employees and dealt most searchingly with the problems involved in the training of new and old workers for each of 20 trades and occupations. Moreover, it revealed, as no other method could have done, the possibilities of cooperation among schools, employers, and workers. The trade understandings explained in this chapter resulted from these conferences and are the expression of the trades themselves as to what should be done.

Trade understandings were perfected for girls in the case of five of the trades and occupations taught in the Girls' Vocational High School—salesmanship, power-machine operating, or garment making, dress-making, millinery, and nursing. The plan is the same for all. The agreements provide that two-year courses be given. For the salesmanship and commercial courses pupils must have completed the eighth grade, and for all the others at least the seventh. A three-month probation period tests interest and fitness for the work, after which the rest of two years, of 10 months each, is given to further instruction. At the end of the period the pupils are to be placed in shops and stores at a beginning wage of not less than \$8 a week, the diploma of the school to be withheld until the close of the first year in the trade when proof of satisfactory service is presented. A committee of employers and employees for each line approved by the board of education is to aid the school authorities by advice and suggestion to make the courses what they ought to be to prepare students for successful careers.

In the case of boys and men the understandings vary for the different trades and occupations. For students taking the four-year technical course at the Central High School, fitting themselves for junior executive and administrative duties in industry, employers have agreed to give preference to graduates of this course at an initial salary of not less than \$50 a month. A committee has been appointed to assist the school authorities in standardizing this work. The course of study adopted at the outset, which was approved by a committee of business men, is given in Appendix C, page 579.

A second type of understanding for boys and men provides that in all trades in which instruction is given the employers and the unions are to urge the attendance of journeymen apprentices upon free evening trade extension classes at the Dunwoody Institute. This understanding was for the following trades: Automobile repair and construction, bricklaying, baking, carpentry, electrical work, telephone construction and operation, machine shop, painting, plastering, plumbing, printing and presswork, steam fitting, cabinetmaking, sheet metal, and stonecutting.

A third type provides that in the stonecutting and steam-fitting trades the unions are to require all apprentices to attend evening classes in trade subjects, and employers are to give preference to persons attending such classes.

A fourth type provides that in the painting, plastering, plumbing, and bricklaying trades all apprentices will be required during three years of their apprenticeship to attend an all-day school at the Dunwoody Institute at least five days a week for two months of the dull season each year. The apprentice is to receive one-half his usual wage while attending school. One-half of the time spent in school is to be devoted to the practical work of the trade and one-half to technical and academic work.

A fifth type covers the cases of boys taking the two-year courses at the Dunwoody Institute in carpentry, cabinetmaking, printing, electrical work, telephony, and automobile repair and construction. It provides that boys are to receive three months of probation or try out to test their interest in or fitness for the trade. At the end of two years they are to be placed at work at a beginning wage of not less than a stated amount, ranging from \$2 to \$2.50 a day, the diploma of the school being withheld until proof of satisfactory work is furnished at the completion of one year. The shops that are parties to the agreement are to use the pupils completing this training as their source of supply of new workers while the supply lasts.

In all cases committees of employers and employees from the trade are to give advice and suggestions to the school authorities on the course of study and methods of teaching.

All the trade understandings described have been approved by employers' associations, signed by individual employers representing both organized and unorganized shops, and approved by the shops in which union rules are observed.

The following are examples of each of the five different types of trade understandings analyzed above. Space will not permit the presentation of each of the 20 agreements signed, but a trade-understanding of a given type is shown, with a statement of other trades that had similar understandings. While these understandings were ratified by associations of employees for organized shops, the arrangements provide for the training of workmen and apprentices from all shops.

EXAMPLES OF TRADE UNDERSTANDINGS MADE BY THE SURVEY.

TYPE I.

Two of these are given here, one in the case of a girls' occupation and the Girls' Vocational High School, and one in the case of a boys' trade and the Dunwoody Institute.

The girls' occupation selected is that of salesmanship. Similar understandings were made for dressmaking, garment industries, and millinery, the only difference being in the make-up of the advisory committee.

Memorandum—Department Stores: Points to Be Covered in Trade Agreement.

In order to insure to young people who wish to become efficient salesmen proper training, afteremployment and a successful career in the business, the following tentative suggestions are made for the city of Minneapolis:

1. That the present school of salesmanship in the Girls' Vocational High School continue to receive pupils who have completed at least the work of the elementary school.
2. That the first three months of a pupil's career in the salesmanship classes be used as a probation period for the purpose of testing the pupil's interest and fitness for salesmanship work.
3. That the remainder of a full two years' period, consisting of two full school terms of 10 months each, be given to the further training in salesmanship work of the pupils thus selected.
4. That an advisory committee of six citizens of Minneapolis be appointed by the board of education, three of whom shall be employers and three employees engaged in merchandising; the employers on the committee to be appointed from a list of not less than 10 approved merchants furnished by the Retail Merchants' Association of the city. The superintendent of schools and the principals of the schools in which courses in salesmanship are given shall be members ex officio of the committee.
5. That the school authorities, aided by the advice and recommendation of the advisory committee, standardize the entrance requirements, the equipment, the course of study, the methods of instruction, the testing of pupils, the commercial experience of pupils, and so forth, while in the school, and the graduation and placement of pupils in the stores.
6. That upon the completion of two years' training, the pupils so desiring be placed in the stores of the city that are parties to the understanding, according

to a plan to be worked out by the school authorities aided by the advice of the advisory committee.

7. That these pupils be placed in the stores on probation for one year, the diploma of the school being withheld until proof of satisfactory work is furnished at the close of one year, provided services are satisfactory.

8. That these new employees be paid an initial wage of not less than \$8 a week upon entering the stores.

9. That, with the assistance of the advisory committee, the career or experience of the pupil, including the instruction which she is to receive after entering the store and during the probationary year, be drawn up, chartered and carried out by the stores which are parties to this understanding.

10. That arrangements be made whereby the services of public continuation classes containing not less than 15 pupils be provided free for those stores desiring such services.

11. That the stores that are parties to this understanding are to agree that they will use the pupils coming out of this two-year period of training as their source of supply in employing new workers until such supply has been exhausted.

12. That the understanding shall be subject to change and ratification at the close of each school year.

I (we) hereby approve of the above understanding and agree to carry it out so far as I am (we are) concerned.

Signed _____

(Name of merchant or firm.)

The boys' trade selected is that of the carpenter. Similar arrangements were made for printing (presswork) cabinetmaking, electrical work, telephony, automobile repair and construction, the only difference being in the amount of the initial wage paid, the range being from \$2 to \$2.50 a day. In the case of all the foregoing trades taught in the day classes of the Dunwoody Institute, the agreements signed by the employers and approved by employees, included the arrangements for the evening classes as well, as will be noted in the case of the carpenters. These evening classes will be discussed under a later type.

Carpenters.

Memorandum of courses for carpenters at the William Hood Dunwoody Industrial Institute for the year 1915-16.

I. Evening classes:

- (a) Free evening classes will be open to apprentices and journeyman carpenters.
- (b) Classes will begin in October and continue through the winter.
- (c) The brief courses will be offered as long as an average attendance of not less than 12 persons is maintained.
- (d) Upon the satisfactory completion of any unit course in the evening school, the student will be given a certificate which will show his attendance and his progress.

II. Day classes:

In order to insure young people who wish to become efficient carpenters proper training, afteremployment, and a successful career in the business, the following tentative suggestions are made for the city of Minneapolis:

- (a) That a two years' course of training for carpentry work be continued in the William Hood Dunwoody Institute.

- (b) That the first three months of a pupil's career in the carpentry classes be used as a probation period for the purpose of testing the pupil's interest and fitness for carpenter work.
- (c) That the remainder of a full two years' period, consisting of two full school terms of 10 months each, be given to the further training in carpentry work of the pupils thus selected.
- (d) That an advisory committee of six members be appointed by the board of trustees of the Dunwoody Institute, consisting of citizens of Minneapolis who are engaged as employers and employees in carpentry work. The principal of the Dunwoody Institute and the director shall be members ex officio of the committee.
- (e) That the school authorities, aided by the advice and recommendation of the advisory committee, standardize the entrance requirements, the equipment, the course of study, the methods of instruction, the testing of pupils, the commercial experience of the pupils, etc., while in the school, and the graduation and placement of pupils in the carpentry shops of the city.
- (f) That upon the completion of two years' training, the pupils so desiring be placed in the shops of the city that are parties to the understanding, according to a plan to be worked out by the school authorities, aided by the advice of the advisory committee.
- (g) That these pupils be placed in the shops on probation for one year, the diploma of the school being withheld until proof of satisfactory work is furnished at the close of one year, provided services are satisfactory.
- (h) That these new employees be paid an initial wage of not less than \$2.25 a day upon entering the shops.
- (i) That, with the assistance of the advisory committee, the career or experience of the pupil, including the instruction which he is to receive after entering the shops and during the probationary year, be drawn up, charted, and carried out by the shops which are parties to this understanding. The following course is offered as a possible scheme. [See Appendix C, p. 574.]
- (j) That arrangements be made whereby the services of public continuation classes containing not less than 15 pupils be provided free for those shops desiring such service.
- (k) That the shops that are parties to this understanding are to agree that they will use the pupils coming out of this two-year period of training as the shops' source of supply in employing new workers until such supply has been exhausted.
- (l) That the understanding shall be subject to change and ratification at the close of each school year.

I (we) hereby approve of the above understanding and agree to carry it out so far as I am (we are) concerned.

Signed _____

(Name of proprietor or firm.)

TYPE II.

This plan has been approved by the board of directors of the Civic and Commerce Association and a special committee of business men approved by that board. It is now in process of development after having been approved by the board of education and ordered carried out.

Proposed Plan for the Training of Noncommissioned Officers of Industry in the Central High School, Minneapolis.

1. The aim of the course is to send boys who have had four years of training in the school out to business and industrial life with a preparation which will help them to begin at the bottom and work their way up rapidly into positions of responsibility on the business and directive side of industry.

The positions which should be open to them in time, through promotion, are above those of the ordinary workers or journeymen and below that of the high-grade technical or scientific engineer. At the present time, these non-commissioned officers of industry find their way into positions of responsibility without the adequate training which they should have. They have the experience but not the technical knowledge. The courses in the school should furnish the industries of Minneapolis a group of promising young men, who have given four years to special training for such positions.

In addition to a good general education, these boys will have when they go from the school some preparation in shop mathematics, business methods, free-hand and mechanical drawing and industrial design, industrial physics, chemistry, industrial and commercial geography; steam, gas, and electric power and transmission; and a considerable amount of shop experience in wood, metal, building materials, and power.

In order to insure positions for graduates of these courses the business men of the city are asked to agree that when they are in need of young men on whom they can rely for employment leading to positions of the character described above, they will come to the school as the source of supply until the supply furnished by each year's graduating class has been exhausted.

It is believed in no case should an entrance wage of less than \$50 a month be offered these students. This amount is practically common laborer's pay and it can not be less if best students are to be attracted to the course, which will require them to forego four years of wage earning in order to make the preparation demanded for present-day efficiency.

TYPE III.

These understandings were made in the case of the four building trades of bricklaying, painting, plastering, and plumbing. The arrangements are the same, with the exception of the wage paid the apprentice attending the school, this difference being due to the difference in wage paid the apprentices in the different trades. It will be noted here again that the arrangements for evening school are included in the understanding with the bricklayers for the dull-season school, which is true for the other three trades. Attention is called to the dull-season arrangement only.

Bricklayers.

Memorandum of courses for bricklayers at the William Hood Dunwoody Industrial Institute for the year 1915-16.

I. Evening classes:

- (a) Free evening classes will be open to apprentices and journeyman bricklayers and masons.
- (b) Classes will begin in October and continue through the winter.
- (c) The brief courses will be offered as long as an average attendance of not less than 12 persons is maintained.
- (d) Upon the satisfactory completion of any unit course in the evening school, the student will be given a certificate which will show his attendance and his progress.

II. Dull-season classes:

- (a) An advisory committee shall be appointed by the trustees of the Dunwoody Institute, consisting of two employers and two employees. It shall be the duty of this committee to assist the officials of the Dunwoody Institute to standardize the work of the school herein proposed and to assist in carrying out this trade understanding.
- (b) The union shall require all apprentices in organized labor during the entire period of their apprenticeship to attend at least five days a week an all-day school at the Dunwoody Institute for the months of January and February.
- (c) Arrangements shall be made with the contractors so that the apprentice shall give during this dull season one-half the time spent at the school and the contractor pay for one-half of the time; that is to say, that the apprentice shall be paid one-half his usual wages while attending school.
- (d) In order to insure the attendance of the apprentice upon the school and his completion of all the training, the money due from the contractor to the apprentice for attendance upon the school shall be withheld and paid to him as a lump sum upon the completion of the full period of apprenticeship. The school authorities shall make such reports as to the attendance, conduct, and progress of the apprentice as the employer and the union may require. When the apprentice is absent with the consent of the school authorities, he shall lose the wage paid for the time by the employer, but when he is absent without the consent of the school authorities he shall lose twice the amount of his wage. If his attendance, conduct, or progress continues to be unsatisfactory to the authorities of the school or to the employer or the union, the case shall be referred to the advisory committee, which shall have authority to release the union and the employer of any further responsibility or obligation for the employment or training of the apprentice.
- (e) One-half of the time of the apprenticeship in the school shall be given to the practical work of bricklaying and one-half to technical and academic work.
- (f) There shall be given to these apprentices during the months of January and February the courses of study attached hereto and marked "Exhibit B." [See Appendix C, p. 575.]
- (g) At the close of the period of apprenticeship, the apprentice shall be given a diploma by the Dunwoody Institute for the work which he has satisfactorily completed at the school and in the trade.

TYPE IV.

This consists of the indorsement of the evening classes at the Dunwoody Institute by the different trades. These indorsements are a part of the same trade understanding made by the different trades for the all-day and dull-season classes. No additional copy of this arrangement is given here, as they will be found in the agreement for carpentry and bricklaying as given in full in the foregoing. These indorsements for evening classes appear in trade understandings for the following: Automobile repair and construction, bricklaying, baking, carpentry, electrical workers, telephone construction and operation, machine shop, painting, plastering, plumbing, printers and pressmen, steam fitting, cabinetmaking, sheet-metal lines.

TYPE V.

This type represents an arrangement made with the steam fitters which requires all helpers entering after August 1, 1915, to attend evening classes at the Dunwoody Institute for two seasons.

Steam fitters.

Memorandum of courses for journeyman steam fitters and helpers at the William Hood Dunwoody Industrial Institute for the year 1915-16.

I. Evening classes:

- (a) Free evening classes for journeyman steam fitters and helpers will be offered at the Dunwoody Institute for the year 1915-16.
- (b) These classes will begin in October and continue through the winter.
- (c) Classes will be continued so long as an average attendance of not less than 12 persons is maintained.
- (d) The unit courses attached to this report will be offered.
- (e) Upon the completion of any unit course a certificate to this effect will be issued to the student by the Dunwoody Institute.

II. The training of helpers:

- (a) The Steam Fitters' Union is to require all helpers in organized shops entering the steam-fitting work after August 1, 1915, to attend, for two seasons of not less than seven months each, evening classes at the Dunwoody Institute bearing on steam fitting not less than two nights a week.
- (b) The employer shall agree to give preference in the employment of workers to the helpers attending such classes, and in the reduction of their force in dull times to give the same preference.

III. The advisory committee:

- (c) That an advisory committee of five members be appointed by the trustees of the institute, two of whom shall be employers and two employees engaged in the steam-fitting business. The fifth member of the committee, who shall be its chairman, shall be a representative of the school.
- (d) The authorities of the school, with the advice and assistance of the advisory committee so secured, are to assist in standardizing the work of this dull-season school.

I (we) hereby approve of the above understanding and agree to carry it out so far as I am (we are) concerned.

(Signed) _____

(Name of person or firm.)

CHAPTER XXIV.

THE PUBLIC SCHOOLS AND VOCATIONAL DIRECTION.

No attempt was made by the survey to outline a comprehensive program for vocational guidance, though the opportunity such work would have to bring education and industry together was recognized from the beginning. The plans already set on foot by the public schools are, however, so important in their possibilities that the report would be incomplete without describing them. Furthermore, the vocational guidance department of the public schools seems to offer the agency by which the material gathered by the survey may be best utilized.

ORGANIZATION ACTIVITIES OF THE DEPARTMENT OF ATTENDANCE AND VOCATIONAL GUIDANCE, BOARD OF EDUCATION.

Statistical division.	Attendance division.	Vocational division.
Permanent school census: Amending files monthly. Following "look-ups." Checking districts. Annual enumeration. Tabulation of reports: Routine school reports. Departmental reports. Special studies, e. g.: Retardation. Vocational aims. Value of civics. Absence of "left" pupils. Location of new buildings. Causes of elimination. Supervision of school records: Drafting blanks. Suggesting changes.	Supervision of transfers, regular and special. Enforcing compulsory education law. Supervision of withdrawals: Investigating and verifying. Notifying school of approval. Recording. Issuing (after verification): Employment certificates. School excuses. Age certificates. Placement (incidental): After school jobs. Vacation jobs. Permanent jobs. Careful records.	Cooperation in survey. (For plans, see below).
		Activities.
		Home investigation. Case work: Families—relatives. Schools—agencies. Prosecuting in courts. Visiting parochial schools. Supervision of children employed. Checking children excused. Census checking. Incidental placement. Home permits. General social work.
	Attendance officers.	
	Responsible for all children between ages of 8 and 16 not enrolled in or in regular attendance at a school. Qualifications—high school education as a minimum and some experience in organized social work.	

In September, 1914, the board of education made a definite beginning toward specific vocational guidance by the establishment of a department known as the "Department of attendance and vocational guidance." This office took over the work of the truant office. To it was committed responsibility for the school census, attendance, employment certificates, and vocational guidance. During the year that has passed this somewhat unique combination of functions has

developed into a department with activities grouped in three divisions, as shown in the accompanying diagram.

In the establishment of the department and in the working out of the details it has been the policy to regard vocational guidance not as a distinctly new agency, but rather as a means of "clarifying, coordinating, and rendering more effective the effects of school, home, and occupation toward the conservation of human resources." With this as a point of departure, the responsibilities have been conceived to be of two kinds—the carrying out of certain immediate functions by a central office and field force, and the promotion and organization of activities in the schools, homes, industries, and other agencies. The diagram indicates for the most part such activities as are at present developed.

Tentative plans of the department for further progress subject to later approval by the board of education are as follows:

1. A more definite organization of the statistical and attendance divisions under responsible heads—statistician and chief attendance officer.

2. The development of a juvenile employment exchange through the cooperation and enlargement of its present functions, namely, supervision of withdrawals, issuance of employment certificates, "follow-up" and vocational survey work, and the solicitation and organization of the interest of employers. It should be noted that the "16-year-old" standard of school attendance materially reduces the dangers attendant upon placement.

3. A continuation of vocational survey work begun by this general survey. An employee of the department acted as secretary to the director of the survey, and therefore brings to the permanent work of vocational assistant an intimate acquaintance with the method, material, and personnel of the survey.

Immediate plans now being developed for encouraging and assisting other agencies to more definite vocational guidance are as follows:

1. To place in the hands of every eighth-grade and high school teacher the information gathered in this survey, both the printed report and charts and other graphic representations.

2. To prepare a list of similar literature of a more general nature now available in the public library.

3. To maintain in the office of the department a model "vocational library" and to provide in next year's budget for the beginning of such a library in each school with grades above the sixth.

4. To modify the present curriculum or program so as to make it possible to introduce the study of vocational material. A beginning has been made. Through a recent study of the value of the present teaching of elementary civics, recommendations have been made which, if adopted, will lead to changing the point of view from

national to community civics and to the introduction of a suitable study of the vocations open to young people.

5. To establish and develop a corps of vocational assistants as rapidly as shall seem advisable, their duty to be to cooperate with the regular school force of teachers and principals in the carrying out of plans, to originate and promote new methods, and to act as the local representatives of the central office. Specifically, the plan is to provide for each high school two assistants (a man and a woman), who shall each spend half of the time in teaching and half in vocational work. The latter duties would consist of (a) supervising all withdrawals, including placement and "follow-up"; (b) supervising the work of student advisors; (c) directing the analysis of students' characteristics; (d) giving personal counsel in special cases; (e) gathering and interpreting school statistics; (f) making local school arrangements for lectures, trips, and the like; and, perhaps, (g) supervising the social and purely recreational activities of the school. There should be two assistants for each high school district, with similar duties in the seventh and eighth grades.

6. To carry on a propaganda among Parents' and Teachers' Associations and other civic bodies for the purpose of arousing interest and explaining the program of the schools.

ORIGIN OF THE GUIDANCE DEPARTMENT.

The organization of the department of attendance and vocational guidance had been recommended to the superintendent of schools and the board of education by the advisory commission of the board, June 17, 1914, in resolutions, a part of which follow:

Resolved, That the advisory commission recommend to the board of education the organization of a department of vocational guidance in the public school system.

SUBRECOMMENDATIONS.

1. That in this department be centralized the following forms of work now being done in part or in whole by existing officers:

- (a) The school census, which should be made permanent.
- (b) The attendance records and the work of the attendance officer.
- (c) The granting of work certificates and the supervision of children at work.

2. That the department of vocational guidance organize and conduct the following new activities:

(a) A continuous investigation of Minneapolis occupations to secure accurate and up-to-date information on the demand for labor of various types, wages, hours of labor, moral and physical conditions, the opportunities these occupations offer young people, the specific qualifications required by them, the training demanded, and the types of persons who may wisely be advised to enter them.

(b) A set of records of each pupil with accounts of his home conditions, his physical condition, his mental and emotional characteristics, and of vocational

aptitude discovered by his school work. Study of children in groups as well as individually, both in school and at work, in order to determine better means of training and of guidance.

(c) Guidance of pupils in the choice of their life work and into training courses in preparation for it, emphasizing training for work as of first importance and securing positions as secondary. Methods of guidance should be:

(1) Through counselors selected from the various schools and directed in their work by this department.

(2) Through the organization of courses of study which will inform children and parents of the needs and opportunities of various occupations, and which will enable them to discover their capabilities and interests.

(3) Through making available by publication and otherwise, information discovered by the investigation of occupations.

(d) The placement of children on leaving school in positions for which they are adapted, to be done either directly by this department or under its direction and supervision by the separate schools.

(e) A plan of "follow-up" which will enable the department to keep in touch with the progress of children who go to work, during the first years of their working life, and to assist them in making a successful transition from school to work.

3. That the department promote and direct the organization of vocational guidance for other young people in Minneapolis—

(a) Through the public evening schools.

(b) Through cooperation with the other educational and social institutions of the city.

(c) Through making available its information regarding occupations and vocational training to advisors of young people throughout the city.

CHAPTER XXV.

A FINAL WORD.

Definite steps shall be taken at once for continuing the work of the survey, for extending it to questions and occupations not covered by this report, and for keeping it up to date. This report should be given wide circulation among parents, teachers, employers, and employees. Further studies should be made, based on the great mass of unpublished material accumulated, and the results should be similarly published and circulated.

The vocational guidance department of the schools should check annually with the industries the data obtained through this survey to keep them up to date. This department also should carry the work of the survey into parts of the field not yet explored.

The trade understandings approved by the trades concerned, whereby boys and girls who have shown interest and aptitude for a given trade or occupation are after two years of training placed at work at a third-year apprenticeship wage, are, in the form in which they have been worked out in Minneapolis, at least, a distinct contribution to the movement for vocational education.

While, for reasons that need not be given here, the schools and classes operated under these understandings will not serve as a means of training all or even the great body of new workers required, they will, if the understandings are carried out, be able to select and train a group of young people who, with their superior equipment, will become in time either all-round workmen or leaders in the industrial life of the city.

Any comprehensive scheme of industrial education for a city like Minneapolis to be efficient and enduring must command the respect and support not only of employers and employees individually, but of their organizations. To command such support is undoubtedly the most difficult and, at the same time, the most important problem before those engaged in industrial education.

The survey gave more attention to this question than to any other. As a result, practically all the representative employers in most of the trades and occupations approved the plans for all-day, part-time, dull-season, and evening classes, and agreed that they would cooperate with the schools in definite ways to make the classes successful.

The organized workers in these trades likewise gave their approval, so far as men in the organized shops were concerned, and promised cooperation.

It was, of course, impossible to deal individually, with the unorganized workers of the different trades. From the outset, however, the survey had in mind the interests of all workers whether organized or unorganized. The general plans for school classes presented to the different trades and occupations for approval had for their dominant purpose the opening up of opportunities for further education, larger wage, and better positions to worthy and ambitious boys and men, girls and women, irrespective of race, color, or affiliations; and the recommendations of the survey committee have been made from the same point of view and in the same spirit.

The success of the worker at his task, his rise in the trade or industry in which he is engaged, depends upon his fitness for the work as well as upon the preparation he has made for its demands. Training is only one thing. More important still, perhaps, is the selection and adjustment of men to their jobs.

In Minneapolis, as elsewhere, the absence of a systematic method of hiring and promoting men is the most serious defect of these industries. All plans and methods being used anywhere for dealing with this problem should be gathered by some authoritative body, like the civic and commerce association. They should be studied by representative committees and individual firms, and the most promising and successful of them put into effect in the industrial and commercial life of Minneapolis. These plans and methods should include those used in school as vocational guidance, at the door of the plant by the employment manager, and in the work of the plant by the superintendent-foreman.

Every effort has been made in the work of the survey and in the recommendations to appeal to the desire for higher efficiency on the part of the worker. Almost every man has before him the possibility of 100 per cent efficiency, as measured by ordinary standards, at least, in some particular task. This he should look forward to as a goal possible to attain and at which, when reached, he will realize his highest and not his lowest valuation.

The boys and men and the girls and women now attending vocational classes, or who will attend them in years to come, will put their time and effort into study and training only because they believe that it counts as an investment.

It rests entirely with the employers whether this confidence is justified. If they fail to recognize and reward by better wage and position those who have gained superior equipment and greater efficiency; if those who have prepared themselves for better work are

buried in the routine of the establishment and find no opportunity to realize on their improved knowledge or skill or taste, then the whole scheme of vocational education, however well planned, will fall to the ground.

On the other hand, if employers encourage their men to improve their efficiency; if this approval manifests itself in wage and position as well as words; if opportunity is given to use the knowledge and skill which they have toiled to acquire, the vocational classes will be filled with eager students. It goes without saying that such a policy on the part of employers, entirely independent of the help it would give the vocational school, would, in the light of all experience, be a wise business policy.

An atmosphere of encouragement is necessary in the shop toward all efforts for improvement, but it will not accomplish much unless there go with it definite arrangements for discovering and advancing the capable, well-prepared man. A larger investment of the time of the employer in human contact, study, and valuation of his employees will be necessary. Methods of standardizing effort must be developed and put into use. This means not only opportunity for the individual, but a business investment on the part of the firm which will yield perhaps more than any other improvement it could make. The public would profit, because increased industrial efficiency means a rising scale of social betterment.

While recognizing the great value of part-time instruction during working hours for the employed youth, the survey was able to do little more than present the idea for consideration by employers. Thus far only one class has resulted, though at least one other is assured. Minneapolis is not yet ready for much work of this character. The American experience of the past decade shows that the opportunities for part-time instruction are very limited everywhere. The fact that Minneapolis has committed itself to compulsory full-time education for all children under 16 who have not graduated from the common schools, precludes also the use of the compulsory continuation school for employed children under 16.

The voluntary release of the youth during working hours so that he may get further education will be a matter of slow growth in Minneapolis as elsewhere. Part-time education in some form and in some way is bound to come because it affords the only means whereby the large body of young workers can be reached and trained. But if the field is to be developed, particularly in cities like Minneapolis where the work in industrial education is just beginning, it must be done by watchful scrutiny in order that experiments may be made in friendly industries and with friendly employers, and then extended to other plants.

Helpful as are the facts and plans produced by the study presented in this report, the social implications of the survey constitute its largest values. More important even than recommendations and programs are the better understandings of the subject of vocational education gained on all sides through the almost innumerable contacts and conferences. Minneapolis has leaped forward years in the careful consideration of the whole matter.

APPENDIX A.—ORGANIZATION OF THE SURVEY.

C. R. Richards, director, Cooper Union, New York City ; chairman.
Leonard P. Ayres, director, division of education, Russell Sage Foundation.
H. M. Gardner, chairman, local survey committee.
C. A. Prosser, director of survey.
Frank E. Spaulding, superintendent, Minneapolis Public Schools.
Charles Winslow, expert, industrial education, United States Bureau of Labor Statistics.
Mary Schenck Woolman, chairman of the woman's committee of the National Society for the Promotion of Industrial Education.

LOCAL SURVEY COMMITTEE.

H. M. Gardner, Gardner Hardware Co., chairman.
A. G. Bainbridge, business agent, Painters' Union.
O. P. Briggs, H. E. Wilcox Motor Co.
Fred B. Chute, real estate, insurance and loans.
Edgar J. Couper, president, Northwestern Knitting Co.
Caroline Crosby, resident director, Unity House.
Mrs. Manley Fosseen, Women's Welfare League.
Mrs. W. I. Gray, Parents' and Teachers' Council.
E. G. Hall, president, Minnesota State Federation of Labor.
N. F. Hawley, treasurer, Farmers' and Mechanics' Savings Bank.
Joseph R. Kingman, attorney.
James W. McCandless, educational secretary, Y. M. C. A., Minneapolis.
W. G. Northup, manager, North Star Woolen Mill Co.
Jennie Shook, teacher, Douglas School.
John Wahlquist, alderman.
Mrs. Frank M. Warren, College Women's Club.
W. F. Webster, principal, East High School.
Mrs. T. G. Winter, Woman's Club of Minneapolis.
Mary Wright, teacher, Girls' Vocational High School.

COOPERATING AGENCIES.

National Society for the Promotion of Industrial Education.
Minneapolis Board of Education.
Minneapolis Civic and Commerce Association.
Minnesota Department of Labor and Industries.
University of Minnesota.
William Hood Dunwoody Industrial Institute, Minneapolis.
Woman's Club of Minneapolis.

GENERAL STAFF OF THE SURVEY.

C. A. Prosser, director.
Cleo Murtland, assistant secretary, National Society for the Promotion of Industrial Education.

Wilson H. Henderson, director of training of teachers of industrial education, extension division, University of Wisconsin.

Jeannette Eaton, co-author, "Commercial work and training for girls."

Merle Higley, vocational assistant, department of attendance and vocational guidance, Minneapolis Public Schools.

H. W. Kavel, principal, the William Hood Dunwoody Industrial Institute.

D. H. Holbrook, director, department of attendance and vocational guidance, Minneapolis Public Schools.

STAFF FOR STUDY MADE BY THE MINNESOTA DEPARTMENT OF LABOR AND INDUSTRIES.

Don D. Lescohier, chief statistician, department of labor and industries, State of Minnesota.

G. A. Gesell, apprenticeship.

D. L. Workman, correspondence schools.

Frank Hoffman, statistics.

Jessie Walkup, statistics.

Caroline Manning, commercial schools.

SPECIAL ADVISORY MANUAL TRAINING COMMITTEE.

W. J. Bogan, principal, Lane Technical High School, Chicago; chairman.

C. A. Bennett, professor of manual arts, Bradley Polytechnic Institute, Peoria, Ill.; editor, Manual Training and Vocational Education Magazine.

L. D. Harvey, president, Stout Institute, Menominee, Wis.

F. D. Crawshaw, professor of manual arts, University of Wisconsin.

F. M. Leavitt, associate professor of industrial education, University of Chicago.

S. J. Vaughan, professor of manual arts, Northern Illinois State Normal School, De Kalb, Ill.; president, Western Drawing and Manual Training Association.

W. H. Henderson, director of training of teachers of industrial education, extension division, University of Wisconsin.

ADVISORY COMMITTEE ON ART IN INDUSTRY.

Will Brown, Will Brown Advertising Co.

Edwin H. Hewitt, Hewitt & Brown.

F. V. Cann, instructor in drafting and industrial design, Dunwoody Institute.

George Monasch, Monasch Lithographing Co.

W. Y. Chute, chairman school committee, board of trustees, Minneapolis Society of Fine Arts.

H. W. Rubins, John S. Bradstreet & Co.

W. T. Cole, The W. T. Cole Co.

F. E. Spaulding, superintendent, Minneapolis Public Schools.

John R. Van Derlip, president, Minneapolis Society of Fine Arts.

ADVISORY COMMITTEE ON HOME GARDENING.

O. P. Briggs, H. E. Wilcox Motor Co.

F. E. Spaulding, superintendent, Public Schools.

A. V. Storm, director, division of agricultural education, University of Minnesota.

ADVISORY COMMITTEE IN CHARGE OF STUDY OF COMMERCIAL WORK AND TRAINING.

John H. Gray, department of economics, University of Minnesota, chairman.
H. P. George, Winston, Harper, Fisher Co.
J. N. Greer, principal, Central High School.
W. B. Morris, Northwestern Knitting Co.
Earl B. Savage, M. W. Savage Factories (Inc.).
Mrs. David F. Simpson, Woman's Club of Minneapolis.
Josephine Schain.
F. E. Spaulding, superintendent, public schools.
Clarence Tolg, assistant secretary, Civic and Commerce Association.
Katherine Wallace, public stenographer.

ADVISORY COMMITTEE IN CHARGE OF STUDY OF EXTENSION TRAINING OF HOME WORKERS.

Bess M. Rowe, home economics specialist in the Agricultural Extension Division, University of Minnesota, chairman.
Dr. J. P. Sedgwick, chief, department of pediatrics, medical school, University of Minnesota.
Lilla P. Frich, supervisor, domestic science, Minneapolis public schools.
Carrie L. Wilkerson, supervisor, domestic art, Minneapolis public schools.
Minnie F. Paterson, superintendent of nurses, instructive visiting nurse committee of the Associated Charities.
Mrs. H. M. Hickok, chairman, home culture committee, College Women's Club.
Mrs. Cassius M. Ferguson, president, Woman's Club of Minneapolis.
Frances Ford, secretary.

COMMITTEE ON HOME NURSING, SANITATION, HYGIENE, AND CARE AND FEEDING OF CHILDREN.

Minnie F. Paterson, chairman.
Louise M. Powell, superintendent, school for nurses, University of Minnesota.
Matilda Carlson, nurse.
Agnes Carter, secretary, infant welfare committee.

COMMITTEE ON HOUSEHOLD EXPENDITURES AND MARKETING.

Mrs. H. M. Hickok, home culture committee, College Women's Club, chairman.
Mrs. J. B. Robinson, president Housewives' League of Minneapolis.
Lena Pope, teacher of domestic science, Girls' Vocational High School.

COMMITTEE FOR OUTLINING COURSES IN TEXTILES, CLOTHING, AND MILLINERY.

Mabel Trilling, instructor in textiles and clothing, College of Agriculture, University of Minnesota.
Mary A. Wright, instructor in dressmaking, Girls' Vocational High School.
Georgia Belle Elwell, instructor in textiles and clothing, Stout Institute, Menominee, Wis.

COMMITTEE ON NUTRITION AND DIET, FOODS AND COOKERY.

Lilla P. Frich, supervisor, domestic science, Minneapolis public schools, chairman.
Mrs. Cassius M. Ferguson, president, Woman's Club of Minneapolis.
Mrs. Charles C. Neale, Housewives' League.

May MacDonald, director, home economics extension work, North Dakota College of Agriculture, Fargo, N. D.

Miss Bess M. Rowe, Agricultural Extension Division, University of Minnesota.

STUDY OF INDUSTRIES FOR BOYS AND MEN.

Building trades—W. H. Henderson in charge, assisted by R. W. Kent and D. R. Drinkall.

Bakery—C. A. Prosser and H. O. Dyck.

Flour—C. A. Prosser and H. W. Kavel.

Metal products—H. W. Kavel, M. R. Bass, and R. R. Griffith.

Printing—D. H. Holbrook, S. S. Selberlich, and J. L. Tripp.

Wood—J. E. Painter and C. O. Field.

PUBLIC AND PRIVATE VOCATIONAL SCHOOLS.

Boys.

W. H. Henderson in charge.

S. J. Mallory, William L. Prosser.

Girls.

Cleo Murtland in charge.

Eleanor Eaton.

STUDY OF INDUSTRIES FOR GIRLS AND WOMEN.

Cleo Murtland in charge.

Department stores—Ethel Linnell and Ina Wisner.

Dressmaking—Cleo Murtland.

Garment trades—Lillian Byrnes and Lillian Leigh.

Knitting mills—Cleo Murtland.

Laundries—Helen Dart and Genevieve Gilruth.

Millinery—Agatha Morris.

STUDY OF ELECTRICAL INDUSTRIES.

R. T. Craig and L. R. Drinkall in charge.

Telephone industry; electric railway; production of heat, light, and power; manufacture of telephone and switchboard apparatus.

Installation switchboard apparatus, overhead and underground construction, armature winder, meter man.

STUDY OF NONCOMMISSIONED OFFICERS OF INDUSTRY.

C. A. Prosser in charge.

R. T. Craig, instructor in mathematics and mechanics, Dunwoody Industrial Institute.

STUDY OF THE PLACE OF ART IN INDUSTRY.

C. A. Prosser in charge.

Anne Ferguson, attendance officer, department of attendance and vocational guidance, Minneapolis Public Schools.

Silas G. Mallory, instructor in manual training, Minneapolis Public Schools.

Merle Higley, vocational assistant, department of attendance and vocational guidance, Minneapolis Public Schools.

F. V. Cann, instructor drafting and industrial design, Dunwoody Industrial Institute.

STUDY OF HOME GARDENING.

Thomas J. Smart, graduate student, University of Minnesota, in charge.

STUDY OF COMMERCIAL WORK AND TRAINING.

Jeannette Eaton in charge.

Field Staff.

Emil Jost, graduate student, University of Minnesota.

Ina B. Rowe, teacher of bookkeeping, Girls' Vocational High School.

Georgia A. Yorke, supervisor of practice work, commercial department, Central High School.

Ann Yorke, teacher in grade schools, Minneapolis.

Caroline Manning, State factory inspector, State department of labor and industries.

Beatrice Finn, student, economics department of University of Minnesota.

Hugh Smith.

Volunteer Investigators.

From the summer class in economics, University of Minnesota: G. H. Newlove, E. L. Johnson, L. E. Cummins, A. Gareis, Henrietta Prindle, J. O. Buswell, H. A. Funks, H. H. Cook, Margaret Udell, Beatrice A. Finn, Alice Harwood, May Oredalen.

STUDY OF EXTENSION TRAINING OF HOME WORKERS.

Bess M. Rowe in charge.

Field Staff—Volunteer Investigators.

Members of Alpha Chapter of Phi Upsilon Omicron, a professional home economics sorority at the University of Minnesota: Helen Bumgardner, Hazel Boss, Ora Conley, Frances Ford, Inez Foster, Priscilla Hough, Susan Hough, Gertrude Jacobsen, Irva Jarshaw, Ruth Johnson, Angeline Keenan, Mildred Kimball, Ruth Lindquist, Eva Rankin, Elizabeth Rivers, Rose Swinburne.

CONFERENCE COMMITTEES.**Industries for Men.****Architects—**

Employers: Edwin H. Hewitt, Hewitt & Brown; William Channing Whitney.

Employees: Mason Larson, Ed Ludwig.

Automobile mechanics—Employers: D. B. Onan, superintendent Reinhart Bros.; R. B. Simming, assistant secretary, Minneapolis Automobile Trade Association

Bricklaying—

Employers: James H. Brown, James H. Brown Co.; Matt Madsen, Madsen Bros.

Employees: J. J. Jones, financial secretary, local No. 2; Matt Sellman, ex-president, local No. 2.

Cabinetmakers—

Employers: J. C. Witte, J. C. Witte Manufacturing Co.; Otto Witte, Otto Witte Co.

Employees: Nels Nelson, business agent, Carpenters' District Council.

Carpenters—

Employers: H. N. Leighton, H. N. Leighton Co.; W. A. Elliott, J. & W. A. Elliott Co.

Employees: Andrew Leaf, president, Twin City Carpenters' District Council and Employment Bureau; Leonard Soderberg, financial secretary, Carpenters' Union No. 7.

Electricians—

Employers: W. O. Hartig, W. O. Hartig Electric Co.; J. W. Helm, Sterling Electric Co.

Employees: S. P. Skoog, business agent, local No. 292; E. N. Stanchfield, treasurer, local No. 292.

Machinists—

Employers: G. H. Snyder, chief clerk in mechanical department, Minneapolis, St. Paul & Sault Ste. Marie Railway Co.; O. P. Briggs, H. E. Wilcox Motor Co.

Employees: Lewis Harthill, business agent, district No. 48; William Hettel.

Painters—

Employers: John M. Locke, Locke & Everlof; Harry B. Cramer, Harry B. Cramer Co.

Employees: J. B. Youngstrom, treasurer, local No. 186; A. G. Bainbridge, business agent, local No. 186.

Plasterers—

Employers: S. G. Leslie, S. G. Leslie Co.; J. B. McCoy, Johnson & McCoy.

Employees: John Wing, secretary, local No. 65; E. A. Wagner, business agent, local No. 65.

Plumbers—

Employers: C. J. Maurud, C. J. Maurud Co.; George Hineline, Hineline & Co.

Employees: E. J. Kelly, business agent and treasurer, local No. 15; George Henderson, secretary, local No. 15.

Printers—

Employers: G. R. Morrissey, Farnham Printing & Stationery Co.; W. T. Cole, The W. T. Cole Co.

Employees: F. H. Histi, business agent, local No. 206, Pressmen and Assistants; N. C. O'Connor, financial secretary, local No. 42, Minneapolis Typographical Union.

Sheet-metal works—

Employers: W. B. Campbell, Minneapolis Steel & Machinery Co.; E. A. Young, Minneapolis Roofing & Cornice Co.

Employees: John Hanley, business agent, local No. 40.

Steamfitters—

Employers: E. Tunstead, Tunstead Heating Co.; H. Kelly, H. Kelly & Co.

Employees: C. L. Egan, business agent, local No. 539; J. C. Mulholland.

Steam and operating engineers—

Employers: Harvey B. Smith, Splady, Albee & Smith; George Cook, Pike & Cook.

Employees: George M. Brown, business agent, local No. 86; W. C. Feeney, State boiler inspector.

Structural-iron Workers—

Employers: August Cederstrand, August Cederstrand & Co.; C. F. Haglin, Haglin-Stahr Co.

Employees: Thomas Kelly, secretary, local No. 19.

Stonecutters—Employers: Arthur V. Jones, Jones & Hartley; L. H. Dapprich, Northwestern Marble & Tile Co.; Samuel Hastings, Hastings Cut Stone Co.; W. V. Grubbs, Indiana Quarries Co.

Industries for Women.

Department stores: E. E. Atkinson, E. E. Atkinson & Co.; George N. Dayton, The Dayton Co.; R. E. Esterley, L. S. Donaldson Co.; C. R. Lane, secretary, Minneapolis Retailers' Association; W. S. MacGregor, Minneapolis Dry Goods Co.; W. C. Whitney, Minneapolis Dry Goods Co.

Dressmaking: Althea W. Fifield, Fifield, dressmakers-milliners; Harriet McGahn, Misses McGahn; L. Morrissey, dressmaker.

Garment industries: A. E. Bates, Wyman, Partridge & Co.; A. C. Johnson of Johnson, Harp & Bostwick; M. C. Kelly, Kelly Neckwear Co.; B. Labovitz, Twin City Manufacturing Co.

Laundries: George Benninghoff, American Linen Co.; A. W. Nevens, Nevens Co.; I. H. Robitshek, Gross Bros.

Millinery: Harriet E. Fifield, Fifield, dressmakers-milliners; Mrs. A. L. Hartman, Hartman's Millinery; Mrs. Lucile B. Nichols, the Young-Quinlan Co.; Al Schranz, Gimbel-Zimmer Co.

ART IN INDUSTRY.

Conferences.

Sign painters: M. H. Brede, Brede Sign Manufacturing Co.; C. C. Sickel, Northern Display Co.

Advertising: Will Brown, Will Brown Advertising Co.; Mac Martin, Mac Martin Advertising Co.

Display men: W. H. Hincke, John W. Thomas Co.; C. J. Larson, the Dayton Co.; Oscar Lindblom, New England Furniture & Carpet Co.; George Young, Minneapolis Dry Goods Co.

Architects: Edwin H. Hewitt, Hewitt & Brown; W. G. Purcell, Purcell & Elmslie; William Channing Whitney.

Furniture: Frank Bertch, Grau-Curtis Co.; G. H. Elwell, Minneapolis Furniture Co.; F. J. Luger, Luger Furniture Co.; M. C. Williams, Minneapolis Office & School Furniture Co.

Interior decorators: Nell Clow, Wm. A. French & Co.; H. W. Rubins, John S. Bradstreet & Co.; Gustav Weber, G. F. Weber Studios.

Jewelry designers: George H. Rentz, Rentz Bros.; W. F. Renich, Kirchner & Renich.

Cut glass and ornamental work: F. R. Atwood, Forman, Ford & Co.; J. G. McNutt, Ford Brothers' Glass Co.; E. L. Sharretts, Mosaic Art Shops.

Photo-engraving: A. F. Bauer, Bureau of Engraving; Albert Huebscher, Minnesota Engraving & Colorplate Co.; F. A. Freeman, Freeman Engraving Co.

Lithography: George Monasch, Monasch Lithographing Co.; W. P. Harmon, Hahn & Harmon Co.

Art novelty: H. M. Brown, Shedd-Brown Manufacturing Co.; G. W. Parker, George W. Parker Art Co.; H. E. Shedd, Shedd-Brown Manufacturing Co.

Fur garments: G. H. Lugsdin, G. H. Lugsdin & Co.; T. W. Stevenson, T. W. Stevenson Co.; J. B. Wick, J. B. Wick & Co.

Woodworking: Aaron Carlson; B. A. Lingdren, H. S. Johnson Co.; W. M. Reetz, Union Sash & Door Co.

APPENDIX B.—PLAN AND METHOD OF SURVEY.

The purpose of this appendix is to show in more detail how the work of the survey was planned and carried out, partly through the use of memoranda and outlines and partly through comment. The material is analyzed in sections taking up different phases of the survey. These are: 1, Chronology of the survey; 2, Agreement for the Minneapolis survey and convention; 3, Outline plan for the survey; 4, Expenses of the Minneapolis vocational education survey; 5, Memorandum on the scope of the Minneapolis vocation educational survey; 6, Blanks used in the survey.

1. CHRONOLOGY OF THE SURVEY.

April 1, 1915.—Conference of F. E. Spaulding, superintendent of schools, with executive committee of the national society.

May 1, 1915.—Beginning of field work.

May 3, 1915.—First meeting director of survey with local survey committee.

May–September, 1915.—One hundred and eighty-six conferences with representatives of employers and employees in industries studied.

September 1, 1915.—Completed field work.

September 9, 1915.—Meeting general survey committee, New York City.

September 10, 1915.—Meeting special manual training committee, Chicago.

October 22, 1915.—Meeting local survey committee.

November 3, 1915.—Meeting local survey committee.

November 5–7, 1915.—Meeting general survey committee, Minneapolis.

December 3–4, 1915.—Meeting general survey committee, New York City.

January 20–22, 1916.—Presentation of survey report to the ninth annual convention of the National Society for the Promotion of Industrial Education, Minneapolis.

2. AGREEMENT FOR THE MINNEAPOLIS SURVEY AND CONVENTION.

It was necessary to have a definite understanding in writing with Minneapolis authorities as to the arrangements for the survey and convention. The form used and the points covered in the agreement which follows have grown out of the experience of the national society:

Agreement Minneapolis Survey and Convention.

The Minneapolis Society for the Promotion of Industrial Education agrees for the consideration stated below to do the following:

1. To conduct in advance of its ninth annual convention a survey of the city of Minneapolis for purposes of industrial education, terminating in a printed report with recommendations, which will be submitted for consideration to the convention.

2. To hold a convention of not less than three days in length in the city of Minneapolis at some time during the month of January, 1916, which will be mutually satisfactory to the program and local convention committees of the society.

3. To manage the survey and convention according to a plan adopted by the executive committee which is made a part of this agreement as Exhibit A (which follows in section 3 of this appendix).

The Minneapolis authorities represented by F. E. Spaulding, superintendent of schools, agree for the consideration given above to do the following things:

1. To provide a fund of not less than \$10,000 in cash, together with additional paid service to the value of not less than \$5,000 or its equivalent with which to meet the expenses of the survey, convention, and printed reports. All expenses of the convention as described in Exhibit B, attached as a part of this agreement (which follows as section 4 of this appendix) which are in excess of \$1,500, are to be borne by the national society.

2. To pay claims for expenses incurred in the conduct of the survey and the convention on vouchers drawn against the above fund, approved by the secretary of the society and countersigned by F. E. Spaulding, superintendent of schools.

3. To give such other cooperation and assistance as may seem necessary to the success of the survey and convention.

3. OUTLINE PLANS FOR THE SURVEY.

Exhibit A.

The responsible agent of the executive committee, in planning and conducting an industrial-education survey shall be a survey committee consisting of seven persons appointed by the executive committee.

This survey committee shall prepare a form of contract with the authorities of the city decided upon for such a survey and shall submit the same to the executive committee for its approval.

The survey committee shall also prepare an outline plan for the conduct of the survey, including a definition of the scope and aims of the survey, organization of the survey force, and character of the reports proposed, and submit the same to the executive committee for its approval.

Scope and aims, organization and character of the reports. The duties of the survey committee are to serve as the chief and final authority in conducting the proposed survey under an outline plan approved by the executive committee.

The survey committee shall appoint a director, who shall be the executive officer of the survey committee, responsible to said committee, and who shall have direct charge of the investigation work of the survey and of the force engaged for the same, under a detailed plan adopted by the survey committee and filed by the executive committee.

It shall further be the duty of the director to develop the findings of the survey in the form of a report and submit the same to the survey committee by the 1st of November.

The survey committee shall hold such meetings as are deemed necessary. These meetings shall be held either in New York or in the city in which the survey is being conducted. Traveling expenses of the committee not to exceed \$1,000 are to be met from the local fund.

The survey committee shall have power to add to its number such persons as it deems wise and necessary. The powers and duties of the persons so added are to be defined by the original committee of seven.

The survey shall include a survey of industries and department stores of the city for the purpose of obtaining data bearing on industrial education, and a survey of the schools of the city to obtain data as to the educational facilities available in the city. Both of these investigations shall be in charge of the director of the survey as the executive officer of the survey committee.

The survey committee shall receive from the director, at stated intervals, reports of progress upon the work, and shall give instructions as to the further conduct of the survey.

The survey committee shall receive and prepare for publication the report of findings submitted by the director.

The survey committee at a meeting on November 6 shall arrange for the preparation of recommendations as to provisions for industrial education based on the findings of the survey committee; shall receive these recommendations at a meeting on December 11, and arrange for their publication two weeks in advance of the annual convention, which is to be held, if possible, not later than the third week in January. These findings and recommendations shall be submitted to the executive committee for consideration and suggestion before publication.

There shall be a local survey committee appointed by the general survey committee on the recommendation of the superintendent of schools of the city in which the survey is to be held, consisting of 7 to 25 persons resident in such city. It shall be the function of this committee to render advice and assistance to the director in the conduct of the survey, particularly in the matter of access to industrial and mercantile establishments, and in developing working relations with employers and labor organizations.

Should difference of opinion arise between the director and the local survey committee they may be referred to the general survey committee, whose decision shall be final.

The survey committee shall, in conjunction with the program committee, set the dates for the annual convention and shall cooperate with the program committee in arranging that part of the convention program which relates to the presentation of the reports of the survey.

4. EXPENSES OF THE MINNEAPOLIS EDUCATION SURVEY.

Exhibit B.

Memorandum regarding the expenses to be incurred and paid by the Minneapolis authorities in connection with the annual convention of the national society to be held in the month of January, 1916.

1. Convention hall for general meeting of the society and halls sufficient in size and number to accommodate the sectional meetings when held, as some of them will be held, simultaneously; and meeting places for conferences of committees.

2. The traveling expenses and hotel bills of such speakers on the program as require this expense to be met in order to secure their appearance. The policy of the society in this connection will be as follows:

(a) Not to pay the expenses of any person appearing on the program who is so situated that his expenses would be borne otherwise by the institution or school system employing him.

(b) Not to pay the traveling expenses and hotel bill of any person whatsoever, unless it is absolutely necessary to do so in order to secure him.

(c) So to announce this arrangement at the time speakers are employed in order that there may be a definite understanding.

3. The entire local expense incurred in the local conduct and management of the convention. This will include all such items as salary of a local secretary, if one is given (this being entirely in the hands of the local committee), clerical or stenographic hire, and all local office expenses of any kind.

4. The cost of mailing all publicity matter. This would include material printed by the local convention committee or furnished by the national society to be sent out by the local committee. The amount of material of the national society sent out by the local committee will of course lie entirely within the discretion of the local authorities. This would also include the cost of any other local publicity work for Minneapolis or the State of Minnesota and adjoining territory. It is understood that the national society will bear the cost of printing its regular preliminary and final program and the cost of mailing the same extensively to its membership and to the country as a whole. Such copies of these programs will be supplied to the local committee as they may deem necessary to meet their needs.

5. Office quarters for the office of the national society to begin, if necessary, one week in advance of the convention and to continue throughout the convention; and arrangements at the places of meeting for facilities for registration and publicity purposes of the national society.

6. The cost of the stenographic service for reporting the work of the convention.

7. Such entertainment and courtesy as the local committee may choose to extend.

5. MEMORANDUM ON THE SCOPE OF THE MINNEAPOLIS VOCATIONAL EDUCATION SURVEY.

This memorandum as given here was prepared at the outset by the survey and submitted to the general survey committee and the local survey committee for approval.

It shows the way in which, by a sort of preliminary survey, the general facts with regard to different occupations were gathered and used in determining things to which the survey should direct its attentions.

It also shows how a community at the outset of a study of this kind can get a great deal of assistance from an analysis of the records of the United States census for the community, and how other material gathered by other agencies can be made serviceable.

This memorandum was placed in the hands of all the field workers as a background for their study.

Finally, the memorandum serves to show the way in which the survey at the outset took account both of the fields to be studied and its resources in money and in service for doing the work.

It follows:

I. Not all vocations can be studied: Neither money nor time will permit. Nor would many of them be significant for the purposes of the survey, whose large aim is to deal with wage earners.

II. All occupations in Minneapolis, classified by the Civic and Commerce Association's survey, from the United States Census Report, 1910, Volume IV, pages 166-180:

Occupations.	Total employees.	Occupations.	Total employees.
Manufacturing and mechanical industries	53,250	Public service, not elsewhere classified..	2,586
Trade and commerce.....	25,259	Agriculture, forestry, and animal husbandry.....	1,978
Domestic and personal service.....	19,423	Extraction of minerals.....	268
Transportation.....	17,202		
Clerical occupations.....	14,863		
Professional service.....	8,648		143,482

III. These occupations will not be dealt with: Transportation, professional service, public service, agriculture, forestry, and animal husbandry and extraction of minerals. Home gardening and elementary agriculture will be studied, however.

IV. Occupations in these groups will be studied: Manufacturing and mechanical industries will be most thoroughly investigated. So far as the time will permit the possibilities of training for domestic and personal service will be covered. The funds of the survey will not permit of a study of commercial training for those in clerical occupations. It is hoped to get this done either through the research department of the University of Minnesota or in some other way. The cost of such a study would probably be about \$1,200. It should by all means be made now when the time is opportune so as to get at the facts and suggestions for most of the large vocations for which the public schools or the Dunwoody Institute might prepare young people.

MANUFACTURING AND MECHANICAL INDUSTRIES.

I. These are classified by the Civic and Commerce Association report as follows:

Industry.	Skilled.		Semiskilled.		Laborer.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Building trades.....	9,379	2	.....	.....	5,494	61	14,936
Metal industries.....	5,324	2	1,743	52	839	7	7,967
Clothing.....	1,236	4,792	144	134	3	.....	6,209
Supervisors and technicians.....	5,310	175	.....	.....	.....	.....	5,485
Lumber and furniture.....	1,272	15	1,379	42	1,347	10	4,065
Food and grain.....	1,081	57	851	477	613	17	3,046
Chemical and drug.....	2,405	6	76	45	272	3	4,807
Printing and engraving.....	1,184	63	294	296	9	2	1,817
Textile.....	2	.....	135	684	48	13	933
Boots and shoes and leather.....	307	2	440	121	18	4	892
Clay, glass, and stone.....	150	.....	253	4	278	1	716
Tobacco.....	.....	.....	244	99	4	2	349
Liquor and beverage.....	.....	.....	203	3	126	1	338
Jewelry.....	150	4	16	1	.....	.....	171
All other industries.....	701	20	1,110	764	821	4	3,420
Total.....	28,451	5,137	6,968	2,697	9,872	125	53,250

II. These occupations will not be thoroughly studied in the manufacturing and mechanical industries:

(1) Tobacco, because all the work is semiskilled, the total number employed is small (349), and all experience, as will be seen by the Richmond survey,¹ shows that all the skill and knowledge required for any of the work can be acquired in the occupations, most of which, in the tobacco factory, at least, are purely automatic.

(2) Liquor and beverage: The same reasons as for tobacco hold good here.

(3) Chemical and drug manufacturing: Of the 2,807 workers in this line given in the United States census report, 2,411 are employed as painters, glaziers, and varnishers. These will be studied in connection with the building trades. The remainder (396) are employed in a number of paint factories, gas works, oil refineries, and other chemical factories. No skilled workers are reported for the entire group of occupations. The number employed is too small, the establishments too numerous and varied, and the entire absence of the need of skill produced by training is too evident.

¹See Bulletin of U. S. Bureau of Labor Statistics No. 163.

(4) **Jewelry:** This is a highly skilled industry, 154 out of 171 employed in it being listed as skilled workers, the highest rating among all the vocations of the city. A separate study is to be made in connection with the survey of the need of trained workers in applied art for the industries of the city, which will deal with this question of jewelry—in fact, the need in this business is almost entirely for taste and skill in applied design.

(5) **Clay, glass, and stone:** The Civic and Commerce Association gives the following analysis:

Clay, glass, and stone.	Skilled.		Semiskilled.		Laborer.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Glass blowers.....	5	.....	188	3	12	.....	208
Brick, tile, and terra cotta.....	.....	.....	9	1	134	1	145
Lime, cement, and gypsum.....	.....	.....	39	.....	95	.....	134
Marble and stone.....	145	.....	40	.....	37	.....	222
Potteries.....	.....	.....	7	.....	.....	.....	7
Total.....	150	.....	283	4	278	1	716

Marble and stone will be dealt with in connection with a study of the building trades. It is quite evident that lime, cement, and gypsum constitute too small a field of scattered plants with no field of training for skill. Potteries are also too small.

The same reasons apply in even greater degree to brick, tile, and terra cotta. Glass blowing is an occupation purely mechanical in character that can only be learned in the routine of the job. However, if it were not so unimportant as a source of employment, it would merit study. The large field to be covered and the limited time, money, and service available justify its omission here.

(6) **Supervisors and technicians:** A separate study will be made of the non-commissioned officers of industry, the people holding positions of responsibility calling for special technical training. This will cover supervisors and technicians, who will be omitted from this general study of the manufacturing and mechanical industries.

(7) **Under all other industries** as the term is used in heading No. 1 under manufacturing and mechanical industries above, the Civic and Commerce Association report gives the following:

All other industries.	Skilled.		Semiskilled.		Laborer.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Piano and organ tuners.....	58	1	.....	.....	.....	.....	59
Pattern and model makers.....	140	3	.....	.....	.....	.....	143
Apprentices.....	412	13	.....	.....	.....	.....	425
Electric power plants.....	.....	.....	.....	.....	40	.....	40
Electric supply factories.....	.....	.....	17	2	12	.....	31
Paper and pulp.....	.....	.....	33	45	29	4	111
Rubber factories.....	.....	.....	14	2	6	.....	22
Paper box factories.....	.....	.....	12	39	.....	.....	51
Not otherwise specified.....	91	3	1,034	676	734	.....	2,538
Total.....	701	20	1,110	764	821	4	3,420

Piano and organ tuners are too few in number. So with the pattern and model makers. Apprentices will be covered in connection with the various trades to which they are attached. Paper and pulp, rubber, and paper box factories

employ only semiskilled workers and laborers and will not be considered here. Electric power plants and electric supply factories will be studied as a part of the electric trades of the city.

III. These will be included:

(1) The building trades, including those as given by the association, report:

Building trades.	Skilled.		Semiskilled.		Laborer.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Builders and building contractors.....	986	2					988
Brick and stone masons.....	1,046						1,046
Plumbers, gas and steam fitters.....	1,207						1,207
Roofers and slaters.....	60						60
Plasterers.....	382						382
Paper hangers.....	210						210
Apprentices.....	142						142
Carpenters.....	5,346						5,346
Painters, glaziers, and varnishers.....	2,405	6					2,411
Structural-iron work.....	36						36
Total.....	11,820	8					11,828

The building contractors will not be studied save incidentally to learn how the small contractor might be benefited by such courses as cost-estimating and free-hand and mechanical drawing. Apprentices will be dealt with under separate trades. All the rest will be studied.

(2) Metal industries: The association report analyzes these as follows:

Metal industries.	Skilled.		Semiskilled.		Laborer.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Molders, founders, casters.....	460						460
Tinsmiths.....	352						352
Boiler makers.....	304						304
Files, grinders, buffers.....	110						110
Mechanics.....	212	1					213
Oilers of machinery.....	136						136
Blacksmiths.....	755						755
Machinists, millwrights.....	2,894	1					2,895
Blast furnaces, rolling mills.....	26		161		177	1	365
Structural-iron work.....	36						36
Copper and brass factories.....	9		12		4		25
Automobile factories.....			56	2	28	1	87
Car and railroad shops.....			595	2	173		770
Lead and zinc factories.....			7				7
Tinware and enamelware.....			20		13		33
All other works.....			892	48	444	5	1,389
Total.....	5,324	2	1,743	52	839	7	7,967

"All other works" will of course be omitted as too indefinite and scattered. Structural-iron work will be handled in connection with the building trades. Copper, brass, lead, zinc, tinware, and enamelware are too small in the numbers represented. So with the automobile factories.

The classification as given for the census is an awkward one for our purposes here. In general all the remaining occupations in the table and others will be covered in the study of establishments.

(3) Clothing industry: The Civic and Commerce Association gives this:

Clothing industry.	Skilled.		Semiskilled.		Laborer.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Dressmakers, seamstresses.....	3	2,999					3,002
Dyers.....	37	6					43
Milliners.....	30	884					914
Sewers, sewing-machine operators.....	51	571					622
Tailors and tailoresses.....	1,115	265					1,380
Apprentices.....		67					67
Hat factories.....			7				7
Suit, cloak, overall factory.....			101	80			181
Other clothing factories.....			36	54	3		93
Total.....	1,236	4,792	144	134	3		6,309

In this table apprentices will be covered in connection with the plants visited. Hat factories are too few in number, likewise dyers. All the remainder will be covered under these heads: Dressmaking and sewing; millinery; occupations in the clothing factories.

(4) Lumber and furniture: The association report gives this showing:

Lumber and furniture,	Skilled.		Semiskilled.		Laborer.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Upholsterers.....	192	12					204
Sawyers.....	204	1	773	15	1,177	9	2,179
Cabinetmakers.....	504						504
Furniture and piano factory.....			322	20	92		434
Coopers.....	347						347
Wood carvers.....	25	2					27
Wagon and carriage factory.....			94	2	25		121
Other woodworking factories.....			190	5	53	1	249
Total.....	1,272	15	1,379	42	1,347	10	4,065

Wood carvers will be dealt with more especially in the special study of the place of art in industry. All the rest will be treated.

(5) Food industries: On these, the association report says:

Food industries.	Skilled.		Semiskilled.		Laborer.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Bakers.....	523	57	53	131	30	5	799
Butter and cheese.....			41	4	23		68
Flour and grain mills.....	499		598	48	495	2	1,642
Fruit and vegetables.....			3	29	23	2	57
Slaughtering and packing.....	9		11		6	1	27
Sugar and candy factories.....			96	171	2		269
Other food factories.....			49	94	34	7	184
Total.....	1,031	57	851	477	613	17	3,046

Butter and cheese cover too few. So do fruit and vegetables, slaughtering and packing, and other food factories. Flour and grain and baking will be covered.

(6) The textile industry and all its occupations will be covered. The Civic and Commerce Association gives this table:

Textile industries.	Skilled.		Semiskilled.		Laborer.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Loom fixers.....	2						2
Beamers and warpers.....			1				1
Carders, combers, lappers.....			3	3			6
Spinners.....			14	12			26
Weavers.....			22	81			103
Winders, reelers, spoolers.....			1	13			14
Not otherwise specified.....			144	575	48	13	780
Total.....	2		185	684	48	13	922

(7) Leather, boots and shoes: The Civic and Commerce Association gives this classification:

Leather, boots and shoes.	Skilled.		Semiskilled.		Laborer.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Shoemakers and cobblers.....	307	2					309
Shoe factories.....			184	108	6	3	301
Tanneries.....			48	6	12	1	67
Harness and saddle.....			208	7			215
Total.....	307	2	440	121	18	4	882

Shoemakers and cobblers represent for the most part little scattered stores of one or two workers, and will, therefore, be omitted as impracticable. Tanneries have no possibilities for training for skill.

(8) Printing and engraving: The association report gives this analysis:

Printing and engraving.	Skilled.		Semiskilled.		Laborer.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Engravers.....	110	1					111
Pressmen.....	172	2					174
Compositors, typesetters.....	839	58					897
Electrotypers, lithographers.....	73	1					74
Printing.....			294	266	9	2	571
Total.....	1,194	62	294	266	9	2	1,817

Engravers will be covered more especially by the separate study of art in industry. So also to some extent with electrotypers and lithographers. All will be met in the printing establishments. Special study will be made of pressmen, compositors, typesetters, and other similar employees.

(9) Laundry operatives: These are taken up under domestic and personal service, which follows.

(10) Engineers: The Civic and Commerce Association gives them under supervisors and technicians, as follows:

Supervisors, technicians.	Skilled.		Semiskilled.		Laborer.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Engineers, technical.....	110						110
Electrical engineers.....	817	2					819
Engineers, stationary.....	1,028						1,028
Total.....	1,955	2					1,957

These people are scattered through many industries and plants. Some way must be found to get a few of each class to find their needs and possibly circularize them all for information.

Domestic and Personal Service.

I. These are classified by the Civic and Commerce Association report in this way:

Service.	Skilled.		Semiskilled.		Laborer.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Barbers and manicurists.....	840	188					1,028
Bartenders.....	754	2					756
Billiard hall, dance hall.....	76	1					77
Boarding and lodging-house keepers.....	126	806					930
Bootblacks.....			75				75
Charwomen and cleaners.....					31	98	129
Elevator tenders.....			263	1			264
Hotel keepers and managers.....	248	95					343
Housekeepers and stewards.....	62	705					767
Janitors and sextons.....	808	93					901
Laborers.....					162	15	177
Launderers, not in laundry.....			22	735			757
Laundry operatives.....			150	934			1,084
Laundry owners and managers.....	119	6					125
Midwives and nurses, not trained.....			36	729			765
Porters.....			534				534
Restaurant, cafe, lunch room.....	229	54					283
Saloon keepers.....	400	2					402
Bell boys and chore boys.....			100	1			101
Chambermaids.....				232			232
Coachmen and footmen.....			96				96
Cooks.....	684	719					1,403
Waiters.....	697	1,106					1,803
Bathhouse keepers.....	17	6					23
Cemetery keepers.....	12						12
Cleaners and renovators.....	42	19					61
Umbrella menders and scissors grinders.....			2	1			3
Others not specified.....	7	2	294	5,997			6,300
Total.....	5,120	3,800	1,572	8,630	193	108	19,428

For reasons that are obvious, the following are stricken from the list of possible subjects of training at the outset:

Bartenders.
Billiard and dance hall employees.
Boarding and lodging house keepers.
Bootblacks.
Charwomen and cleaners.
Elevator tenders.
Hotel keepers and managers.
Laborers.
Laundry owners and managers.

Porters.
Saloon keepers.
Bell boys and chore boys.
Coachmen and footmen.
Bathhouse keepers.
Cemetery keepers.
Cleaners and renovators.
Umbrella menders and scissors grinders.

Barbers have from time immemorial been trained to meet American conditions satisfactorily by the helper system. Manicuring, a profitable occupation, is very quickly learned by the helper system. The conditions attached to this calling almost put it in a class with those of the bartender and saloon keeper above.

All the rest merit consideration so far as time and resources will permit. Minneapolis is the home of large laundries, which will be studied. The large number of midwives and untrained nurses, particularly the latter, challenge investigation to see how this situation can be improved. All the rest, laundresses not in laundry, restaurant, café, and lunch rooms, chambermaids, cooks, waiters, and others not specified, most of whom are undoubtedly servant girls, involve the practice on a commercial basis of some of the old home duties, such as care of linen or clothing, cooking, sewing, waiting, etc., and afford a more interesting and profitable field of investigation.

Workers in the home: Entirely independent of all the above, there is needed a study of the kinds of short courses of training and lectures in sanitation, decoration, care of the sick, care of children, etc., which Minneapolis could work out in part-time and evening classes for those busy in their homes. These will be dealt with as far as time and the service available will permit.

Training for Leadership.

Many responsible positions in the industries are held by men who have been advanced from the ranks of the ordinary worker to positions between them and the technical or chemical expert at the top of the business. They are holding positions like that of the building foreman, the cost estimate man, the layout man, the inspector, and the tester. An effort will be made to get the facts about the needs of ambitious men preparing themselves for important positions and the best ways to meet these needs.

The Place of Art in Industry.

1. **Two sides to the question:** Training in better taste for all in the purchase and use not only of pictures and statuary, but of clothing, furniture, wall paper, carpets, tapestry, lamps, etc. Training in a higher standard of taste and skill in the production of things to meet this demand. One is training for intelligent consumption; the other training for better production. The survey is concerned only with the latter.

2. **Training for better taste in production:** To what extent is Minneapolis a field for training in the applied arts? This involves a widespread inquiry as to the positions which require or admit of the use of taste in color and design.

3. **A partial list of the field in Minneapolis:** It is recognized that only the study will reveal all the industries and occupations within them which admit of training in color and applied design. A few possibilities are given and by way of illustration:

Draftsmen for architects.
Machine designers.
Engravers for goldsmiths and silver-smiths and jewelers.
Photo-engravers.
Lithographers.
Electrotypers.
Printing.
Bookbinding.
Commercial advertisers.
Pottery.
Artificial stone.

Marble and stone cutting.
Ornamental-iron work.
Pattern makers.
Brick, tile, and terra cotta.
Wood carvers.
Cabinetmakers.
Interior decorators.
Furniture.
Milliners.
Costume design.
Tailors.
Ornamental-iron work.

C. BLANKS USED IN THE SURVEY.

It is not possible to include here either comment or copy of all the outlines and blanks used. Most of these can be obtained from C. A. Prosser, Dunwoody Industrial Institute, Minneapolis, Minn. Several, however, seem to merit attention. One was used by field workers to get facts about departments within an establishment and occupations within a department, and was known as "Department Chart" or "Analysis of Industry Chart."

DEPARTMENT CHART.

Industry, Flour, Establishment, Department, Wheat storage.

		<i>Sweeper.</i>	<i>Wheat loader.</i>	<i>Otter.</i>	<i>Elevator man.</i>	<i>Loader foreman.</i>	<i>Elevator foreman.</i>
1	Job.....						
2	Sequence or lack of sequence.....						
3	Numbers engaged at present time.....						
4	Numbers taken on during one year.....						
5	Numbers dropped in one year.....						
6	Numbers promoted in one year.....						
7	Ages.....						
8	Wages.....						
9	What the worker does.....						
	Needed for efficiency on the job:						
10	Physical qualities.....						
11	Mental qualities.....						
12	Knowledge of general kind.....						
13	Knowledge about job.....						
14	Skill.....						
15	How much of last two can be acquired in routine work?.....						
16	Common deficiencies of workers.....						
17	Is the industry hampered by lack of knowledge or training on the part of beginners?.....						
18	Where do new workers come from?.....						
19	How are workers selected?.....						
20	Are they given any special training?.....						
21	How long is required for the promoted worker to acquire working efficiency on the job as compared with a beginner?.....						
22	How far is the advantage of promotion offset by other considerations in filling a job and what are they?.....						
23	Is superior ability and efficiency recognized by promotion or increased wages?.....						
24	Any suggestions for improvement upon the plan employed as to selection, promotion, and training of workers.....						
25	Is systematic instruction in either technical knowledge or manipulative skill desirable after the worker has entered the industry?.....						
26	Could such instruction be most helpfully and practically given inside of the industrial establishment or in part-time day courses or in evening classes in special schools?.....						

The blank shown is that for the flour industry. In the office of one of the mills, the productive work was studied in storage, wheat cleaning, grinding, and bolting, and packing and shipping departments. No study was made of the office work in the sales department. A chart was used for each department, the one shown being for wheat storage. This department was analyzed into the various jobs or occupations, such as wheat loader, sifter, oller, elevator man, loading foreman, and elevator foreman. The name of each occupation was entered at the head of a separate column beginning with the lowest, at the upper left-hand side of the chart, and positions are listed in the order of promotion.

Down the sheet, beginning with "Sequence or lack of sequence in promotion," and ending with "Could such instruction be more helpfully and practically given?" are the 25 points upon which information for each position or job in the wheat storage department was obtained.

As the chart was cumbersome and limited as to space, each worker was provided with separate cards for each of the 25 points, beginning with number 2. These were used to record detailed facts. As an example, the card used for elevator foreman giving information on point No. 9, as to what work he does, is here given:

Industry, *Flour.* Establishment, _____. Department, *Wheat storage.*
Job, *Elevator foreman.* Person consulted, _____. Date, *May 10, 1915.*

9. What the worker does

Gets samples of wheat from incoming cars, inspects it, sifts it out to see if dockage corresponds to dockage for chaff and dirt allowed State inspection. Reports to office the results and stops unsatisfactory cars until proper

(Over)

After the study of the department was made, the material on these cards was condensed and then written in the proper place on the department chart. Where space was insufficient, the information was written partly on the back of the chart and cross-referenced; in this way condensed statements on each point were obtained.

During the progress of the survey a number of instruction sheets bearing on the "department chart" as described were issued to field workers. The most important of these was a memorandum on "Suggestions bearing on the department chart," which follows. The points covered are given the same numbers as on the chart. Its purpose was to furnish information and suggestions to help workers in their interpretation of the different points given on the department chart.

SUGGESTIONS BEARING ON THE DEPARTMENT CHART.

1. Regarding the Job.

Job.

Numbers at present time.
Numbers taken on in year.
Numbers dropped in year.
Numbers promoted in year.

Ages.

Wages.

What the worker does.

What is required to hold job:

Physical qualities.

Mental qualities.

Knowledge of general kind.

Knowledge about job.

Skill.

How much of last two can be acquired in routine work?

Where do new workers come from?

How are workers selected?

Are they given any special training?

Is superior ability and efficiency recognized by promotion or increased wages?

Is your system satisfactory, or can you suggest any improvement in the selection, training, or promotion of workers?

2. Sequence or Lack of Sequence in Promotion.

1. Is there a regular and fixed line or sequence of promotion of workers from one position to another in the department?
2. Get the jobs in the order of their fixed and definite sequence in promotion.
3. If there is no such sequence in promotion, list the jobs of the department, beginning with the lowest in the order of the wages paid for each.
4. Is there a sequence of promotion from this department to another?
5. If so, from what job or jobs in this department to another?
6. List also the department in the order of the best position in each in terms of wage.
7. Where a sequence is only partially observed or practiced, this should be described.

This information should be gathered at the outset, when the "chart analysis" into departments and positions within departments is made.

3. Numbers at Present Time in Occupation.

1. Ordinary number employed in the standard organization of the plant.
2. Lowest number employed during the year.
3. Highest number employed.

NOTE.—This information should come from the records of the establishment. There are three ways to get it:

- (a) By letter or blank to the employer asking for it.
- (b) By personal visits of the director of the survey to the office of the concern.
- (c) By office visits of the field workers.
- (d) Probably all must be used in different cases.

4. Number Taken on in the Year in the Occupation.

1. Total number of new workers employed during the year from every source.

NOTE.—This information should come from the records of the establishment. There are three ways to get it:

- (a) By letter or blank to the employer asking for it.
- (b) By personal visits of the director of the survey to the office of the concern.
- (c) By office visits of the field workers.
- (d) Probably all must be used in different cases.

5. Number Dropped During the Year in the Occupation.

1. Total number who left the occupation for any cause during the year.
2. Causes of withdrawal: (a) Death, (b) discharge, (c) other causes.
3. Causes of discharge: (a) Slack season, (b) trouble with foreman, (c) unsatisfactory work, (d) drunkenness, (e) other causes.

NOTE.—This information should come from the records of the establishment. There are three ways to get it:

- (a) By blank or letter to the employer asking for it.
- (b) By personal visits of the director of the survey to the office of the concern.
- (c) By office visits of the field workers.
- (d) Probably all must be used in different cases.

6. Number Promoted During the Year in the Occupation.

1. Total number promoted to all positions.
2. Positions to which promotion was made.

NOTE.—This information should come from the records of the establishment. There are three ways to get it:

- (a) By letter or blank to the employer asking for it.
- (b) By personal visits of the director of the survey to the office of the concern.
- (c) By office visits of the field workers.
- (d) Probably all must be used in different cases.

7. Ages of Workers in the Occupations.

1. Lowest age of workers.
2. Highest age.
3. Usual or prevailing age.

NOTE.—This information can probably be obtained from the records in some cases. Field workers should ask for it for each occupation. The same questions should be asked of the advisory committee for each trade or occupation.

8. Wages in the Occupation.

1. Highest wage.
2. Highest age.
3. Usual or prevailing wage.
4. Method of determining wage: (a) Hourly basis, (b) weekly basis, (c) piecework, (d) bonus system with piecework.

NOTE.—This can be obtained, so far as standard wage for the skilled trades go, from the bulletin of the Bureau of Labor Statistics (143). Should be gathered through the advisory committee also, and by the field worker from the office and shop.

9. What the Worker Does in the Occupation.

1. What are the important operations performed by the worker? What is wanted is not a description of the manufacturing process in which he is engaged but an account or description of what the worker himself does. Watch him work. Keep your eye on his actions, not those of the machine; and record those that are important, showing judgment, skill, experience, or responsibility.

2. What is the responsibility of the worker? By this is meant what is the essence of the task he performs—where his responsibility begins and ends.

3. Illustrations: Below are given statements of what the worker does, which illustrate what is meant by the above.

Weaver.

He is required to keep two looms running and turn out a maximum amount of inspected cloth under a bonus system. He starts and stops the loom by throwing a lever controlling a belt; puts new bobbin into empty shuttle; inserts the shuttle in the loom and connects the thread, the machine stopping automatically when the thread upon the bobbin runs out. He traces and ties ordinary broken threads and cuts off the cloth when the required amount has been made as shown by an indicator.

He has practically no responsibility for the condition of his machine, minor repairs being made by a gang boss and serious ones by mechanics employed instead of loom fixers. Where gouges or serious entanglements of threads occur they are corrected by skilled girls employed for the purpose.

Button Sewing.

Button sewing, like buttonhole making, is largely a mechanical process but demands less responsibility on the part of the worker than buttonhole making, because there is much less danger of injuring the fabric to which buttons are sewed. The worker places a button in the slot in the specially designed presser foot of the machine, slips under the presser foot the cloth to which the button is to be sewed, always with the button in the right location, and starts the machine, which, like the buttonhole machine, is set for a definite number of stitches and stops automatically when those stitches have been made.

Buttonhole Making.*

The chief requirement of the buttonhole worker is placing the buttonholes accurately on the garment. Except for detecting and avoiding bad work, which is essential in operating all special machines, though more serious with the buttonhole machine than with any other machine except the hemstitching machine, little responsibility is demanded of the worker. In making buttonholes by machine the worker places the cloth in the right position for the buttonhole, starts the machine, which is set for the number of stitches required for the buttonhole of the length desired, and takes the finished work from beneath the presser foot, repeating these three operations over and over, except as before noted, when the thread breaks or the machine does not operate properly. As it is exceedingly difficult to change a buttonhole after it has been cut by the knife the worker must be careful to avoid mistakes.

* This information can be gathered only by the field workers by watching the worker at his task in the shop, and by questioning worker, gang boss, and foreman.

10. The Physical Requirements of the Occupation.*

The effort here should be to state the physical assets or qualities desirable or necessary for the successful worker. These should be defined as either desirable or necessary. The reason why the qualification is needed should be shown. For example:

The spinner should be free from throat and lung troubles because of flying lint. She should not be of heavy weight but rather light and supple, because she must move from place to place rapidly in replacing bobbins, tying broken ends, and so forth. She should be quick of movement, have small rather than large hands to deal with the small threads, and be deft in her work, because the rapidity of her work calls for accuracy of movement with her hands. The mere statement of abstract qualities like quickness, strength, health have no meaning and should be avoided.

* NOTE.—This is to be obtained by field worker through study of the worker himself by inquiries from foreman as to what type of worker is the best. It should also be gathered by conference with the advisory committee.

11. Mental Requirements of the Occupation.*

1. What is wanted here is the mental assets or qualities desirable or necessary for the best worker. These should be stated as desirable or necessary. A recital of certain abstract qualities which these good workers enjoy along with other people is of little value unless accompanied by the reason why the qualification is needed. For example: A stenographer must be systematic and orderly, because she is required to file and keep track of important material. She must be neat and painstaking in her work as the very first essential.

She should be of even temperament in order to deal with the public and the office force successfully. She must be quick of perception and rapid in her actions to take dictation properly.

* NOTE.—The field worker should get this by studying the worker and by asking questions of him and the foreman. Some little help may be obtained, although this is doubtful, from the advisory committee.

12. Knowledge of General Kind Required in the Occupation.*

1. In the case of every worker there are two kinds of training to be considered: (a) Training for his present occupation; (b) training for promotional capacity. The question here is concerned only with the first. The second will show itself when the general knowledge required for either occupation higher up the line is found in connection with the separate study of these other occupations.

2. The question here has nothing whatever to do with the general education everyone should have, including the workers in any occupation, as a preparation for life and for citizenship. What is wanted is the knowledge gained in the schools which he needs to carry on this job. This knowledge should be stated not in terms of years or grades in schools but in terms of the specific things he must know to do the work of his job. The study will take care elsewhere of the training of the worker for citizenship. Illustration: A doffer boy to do his work must know how to read and write and count to one hundred. The first in order that he may understand notices, orders, communications, the last so that he may count bobbins.

3. The main question suggests such inquiries as these:

Is any arithmetic needed? If so, what, and why?

Is any reading or writing? What, if any?

Geography, what and why?

* NOTE.—This is to be secured by the field worker through watching what the worker does, by talking with the worker and the foreman. It will also be brought out in the conference with the advisory committee.

13. Knowledge Required About Job for the Occupation.*

1. By this is meant what knowledge does he need to do the work successfully of his present occupation.

2. Here again the technical and trade knowledge he should have to give his promotion capacity will be brought out when the preparation necessary for other jobs higher up the line is brought out in connection with this separate study. What is wanted here is the knowledge for the single occupation.

3. The question includes both related technical knowledge and the knowledge gained in the shop of the best ways of doing things, "tricks" of the trade that he should have.

4. Illustration: The boss carpenter should, among other things, know how to read blue prints, take off quantities, make estimates of dimension, stock, and cost of construction, make freehand sketches, submit bids and specifications, make contracts of usual kind and keep simple accounts. He should know how to make freehand sketches (for example) so that he may at least be able to represent his ideas on paper for the architects on the one hand and for the direction of his men on the other.

* NOTE.—Field worker should get from the study of the worker and from questioning him and the boss or foreman. Handbooks on some of the trades may be available either in the library of the survey or in the Minneapolis

Public Library. These should be used only as suggesting things the worker in an occupation should know and should be checked up against the actual situation in Minneapolis in every instance. The conference with the advisory committee from last occupation should give valuable aid on this also.

14. Skill Required in the Occupation.*

1. How long does it take the "green hand" to learn the work?

(a) This is one very good index of the teachable content of the job. For example: A New Jersey textile mill has found that it required only about three weeks to prepare a person taken from the street to do the weaving required by the mill.

2. A sharp distinction must be drawn between this question and two others: No. 10, "Physical requirements of the occupation," and No. 11, "Mental requirements of the occupation." These two questions bear on the physical and mental qualities more or less natural and hereditary. The inquiry as to skill required bears on these qualities, as trained by experience either in the routine of the shop or by some systematic plan of training. Skill has to do with abilities to do specific things.

3. What are the special abilities required of the worker in this occupation? This is the real meaning of the question.

(a) This is to be answered by an interpretation of what the worker does as set forth in answer to question 9 on terms of what abilities or capacities he has to have to accomplish them properly. For example, take the weaver whose work is described in question 9. He must be able to tell with his eye when the bobbin in the rapidly moving shuttle is empty so as to anticipate the automatic stopping of the machine, by stopping the machine and inserting a full bobbin which he has ready—thus saving time. He acquires speed in inserting a new bobbin placing it in the shuttle, threading the shuttle and replacing it in the machine. Speed and deftness in connecting breaks and tying threads is demanded also. There is no call for any skill or dexterity whatever in repairing his loom since this is taken care of by gang bosses and machinists. The skill required is very meager and can be gained in very short while by ordinary persons.

4. It is very doubtful whether in previous questions 9, 10, 11, and 13 can be dealt with separately in a study since they are so closely related. The field worker must keep all of these questions in mind even though in his first report he writes them up separately.

* NOTE.—This information by field worker from study of job, asking questions of worker and foreman. Conferences with advisory committee should also help greatly with this.

15. How Much Knowledge and Skill Required Can Be Acquired in Routine Work in the Occupation?

1. The effort is to here find out through question 15 two things:

(a) What the worker gets on the job in the ordinary routine of the work. This is the direct answer to question 15. In answering it there should be as explicit a statement as possible of just what the worker learns in the job. For example: The weaver in the New Brighton Mills, at Passaic, N. J., where they make the cotton webbing for automobile tires, is given a three weeks' training as an apprentice at a teaching loom under a special instructor before he is given any looms of his own to operate under a bonus system. This gives him a start in all the requirements of the position, but after he goes to work for him-

self, he acquires confidence and skill in operating the loom, removing and refilling the shuttle, inserting it, starting the loom, detecting breaks, tying broken ends, repairing gouges. He got his knowledge of what to do and how to do it at the teaching loom, but he acquired skill in the process itself in the routine of the job.

(b) What the worker needs which the job does not give, which either the industry or the school should give: This will be secured by subtracting the answer to question 17 from the questions 13 and 14. The latter two tell what he now gets. For example: In the case of the weaver just described, it is apparent that nothing remains for the school to do since the responsibility of the preliminary training before weaving is undertaken by the workers and results would seem to indicate that the plant was training its own workers admirably.

16. Common Deficiencies of Workers.*

1. By this is meant—what are the shortcomings of every kind of worker which prevent them from doing their work in a satisfactory way in this job?

2. Physical deficiencies of workers: From another angle this gives an opportunity to check back against a previous question No. 10 or "Physical requirements of the job." Here again the effort should be to state these physical deficiencies in terms of lack of qualities necessary to do specific things on the job.

3. Moral deficiencies of workers: The answers on this score might well include lack of ambition, drunkenness, shirking of tasks.

4. Mental deficiencies of workers: This gives an opportunity to check back from another angle against a previous question No. 11, "Mental requirements of the job." Here again the effort should be to state the sequence in terms of lack of quality or qualities necessary to do efficiently specific things on the job. It will be noticed that questions 10 and 11 of the chart call for a statement of what the job demands, while questions 2 and 4 of the sheet call for a statement of which of these demands are lacking in the usual worker.

5. In answering the above questions, separate consideration should be given to the whole question of promotional capacity.

* NOTE.—This information is to be obtained from the workers, the superintendents, foremen, and gang bosses and through conferences with advisory committees. It can also be arrived at by checking the physical and mental requirements obtained from questions 10 and 11 on the chart against the inspection of the worker's work and the worker himself.

17. Is the Industry Hampered by Lack of Knowledge or Training on the Part of Beginners? *

1. This question follows No. 16, which, on the chart, deals with common deficiencies of workers in order to give special consideration to their deficiencies in knowledge and training.

2. Questions 12, 13, and 14 on the chart deal with the amount and kind of general knowledge about the job and the skill required for efficient work in it. This seeks to find out what of this knowledge and skill is lacking in the worker and how far the industry is hampered by this lack.

* NOTE.—The answer to this question is to be obtained by the field worker from foremen, gang bosses, and workers. Also by checking questions 12, 13, and 14 against the answers.

18. Where Do New Workers Come From? *

1. From rival plants inside the city?
2. From rival plants outside the city?
3. By promotion within the plant?
4. If so, from what occupation?
5. As green hands from the city?
6. As green hands from outside the city?

* NOTE.—This information is obtained by the field worker from the employment manager of the plant, if any, from the superintendent, foreman, and gang boss.

19. Method of Selections in the Occupation.*

1. How are they selected:

(a) Collect all records used by employers in the way of application blanks, records, salary sheets, and discharge records we can get. Possibly a letter will be sent out to all employers asking for this material. Field workers are to get just as much of this material from the offices of the concerns as they can. Where any objection is raised because of the letterhead or title showing, name can be detached and assurances given that the material will be treated as confidential.

(b) Questions dealing with present methods used: (1) What tests are made? (2) What training is required? (3) What age is preferred?

* NOTE.—This information should be gathered by the field worker from the foreman on the job.

20. Are New Workers in This Job Given Any Special Training for It? *

1. By this is meant—whether any instruction is given to the new worker on the job, of any kind whatever and, if so, what it is.
2. Is this instruction haphazard or systematic?
3. Is it given before the worker comes to the job, at the time or in connection with his taking on of the new job or afterwards?
4. Is it an apprenticeship system of instruction, a helper system, or a routine system, a school system, etc.?
5. Does the employer provide any printed instruction of any kind concerning this scheme or for the help of the new workers?
6. Collect all printed material bearing on this subject.
7. Get a complete description of the training scheme or the lack of it.

* NOTE.—This information by the field worker from foreman and workers. Also by advisory committee conferences.

21. How Long is Required for the Promoted Worker to Acquire Working Efficiency on the Job as Compared with a Beginner?

1. The attempt here is to throw some light on the question of whether it would be advisable from the standpoint of efficiency to promote from below rather than bring a green hand into the plant for the job.

2. This information can be gathered by the field worker from the opinions of the foreman. Some light will come from conferences with advisory committees.

3. What asset of knowledge or skill would the promoted worker bring to this job? The effort here is to get some definite statement of what is valuable and helpful for the new task, which the promoted worker brings that the green hand outside the plant does not.

4. This information is to be gathered by watching workers at the job, from workers, foreman, also by conferences of advisory committees.

22. How Far is the Advantage of Promotion Offset by Other Considerations in Filling a Job, and What Are They?

1. It may be that firms have found reasons which make promotion as between departments, for example, inadvisable. Among such reasons might be:

(a) Two new workers started in two different jobs at the same time rather than one worker into one job.

23. Is Superior Ability and Efficiency Recognized by Promotion or Increased Wages?

1. Undoubtedly, some of this takes place in every establishment. The vital question is how far the plant is organized to deal with this question in a systematic way. Such questions as these suggest themselves:

(a) Has any systematic scheme of measuring efficiency of workers been installed? Collect all blanks used for this purpose.

(b) Has any systematic system of increasing wage according to efficiency been installed? Get blanks for this.

(c) Has any systematic scheme of promotion been established? Get blanks for this.

2. Get description of any schemes used.

3. Interview superintendent, foreman, and workers. Take down oral statement as accurately as possible. Get at least four workers in this job.

24. Any Suggestions for Improvement Upon the Plan Employed as to Selection, Promotion, and Training of Workers?

1. An answer should be gotten to this question from the foreman of each department and from the superintendent of the plant for a comprehensive statement for the whole plant. Also from workers. These answers will represent only the opinions of these men.

2. Before completing his work, the person who deals with chart questions 21, 22, 23, and 24 should also offer his suggestions to question No. 24.

25. Is Systematic Instruction in Either Technical Knowledge or Manipulative Skill Desirable After the Worker Has Entered the Industry?

1. This calls for the opinions of the foreman, gang bosses, superintendents, and workers. When this question is put, the other question of promotional capacity for the next job should be separated and put independently in getting opinions.

2. The field worker who deals with the job should also put his opinion as the result of his study into writing.

3. The investigator should also get the ideas of these men as to the specific things this systematic instruction should cover. So with the advisory committee.

26. Could Such Instruction Be Most Helpfully and Practically Given Inside of the Industrial Establishment or in Part-Time Day Courses or in Evening Classes in Special Schools?

1. At the outset, the investigator must be able to explain what is meant by the different kinds of part-time schools. This should be talked over with Mr. Prosser. Also evening schools.

2. Here again opinions of foreman, gang bosses, superintendents, and workers should be gathered.

3. So the opinion of the field worker should be written.

APPENDIX C.—OUTLINES OF COURSES OF STUDY WORKED OUT BY THE SURVEY WITH THE TRADES AND APPROVED BY THEM.

A considerable part of the time spent in conferences between the survey and representatives of the different trades was devoted to the formulation of courses of study to meet local needs.

The suggestions from the trades have been organized into courses of study now being given by the Dunwoody Institute for men's trades, and by the Girl's Vocational High School for women's trades. It was recognized from the start that these suggestions needed to be adapted to the teaching requirements of the school and must necessarily be modified from time to time according to school experience and changing trade conditions.

It is impossible to publish all the courses worked out for more than 20 trades. However, the survey committee, while not giving to these courses extended study or approval as a committee, has deemed it helpful as illustrating the method of the survey as well as the contributions of the trades to include a few of them here. They are offered entirely without comment or suggestion, as an earnest effort on the part of the trades to meet their own problems. As given they indicate the matter to be presented rather than method of treatment.

Two courses of study for girls and women and six for boys and men are given. In the case of the women, salesmanship and garment making were taken because they represent the two largest lines of employment for girls and women and are widely different.

In the case of the men's trades, four courses of study were chosen to represent day, dull season, and evening classes, giving instruction for the occupations of carpenter, bricklayer, cement and concrete and telephone worker, respectively. A fifth course offers suggestions as to what should be taught workers in the milling industry, while a sixth gives the technical course recently established at the Central High School.

COURSES FOR GIRLS AND WOMEN.

The salesmanship courses, approved by representatives of the department stores, are designed primarily to indicate the possible organization of classes within the department stores themselves and the subject matter which they should teach. While most of these courses could probably be given within the stores and much of the instruction could probably best be given by buyers and expert sales persons, the outline also suggests subject matter for part-time classes. This is particularly true of the introductory and elementary courses (I and II), which give the ideas of the store people as to what should be taught in the all-day class in salesmanship in the Girl's Vocational High School where the girls give two years to instruction in elementary salesmanship before being placed in the stores under a trade understanding between the board of education and the merchants.

Courses for girls and women are outlined as follows:

I. Salesmanship.

- I. Introductory course for aisle girls, messengers, stock keepers, and others who wish to qualify as sales persons. (1) To test the general ability; (2)

to determine the attitude toward store work; and (3) to serve as a basis for eliminating those lacking fundamental education.

1. Arithmetic.

A. Fundamental processes, common and decimal fractions as applied to—

a. Money; b. quantities; c. measurements.

2. English and spelling.

A. Oral English.

a. For ability to express simple information about merchandise correctly; b. for use in greeting a customer and ordinary conversation.

B. Dictation exercises to test

a. Ability to take customers orders or directions; b. common facts about merchandise.

C. Spelling lists of words selected to suit the needs and ability of each group of beginners.

a. Words in common use; b. names of merchandise; c. names of streets.

3. Personal hygiene and dress.

A. Care of the hair, nails, and teeth.

B. Neatness in dress and its importance in store work.

4. Store deportment.

A. Toward customers.

B. Toward fellow employees.

5. Store system.

A. How to make out sales slips.

B. Policy of the store with regard to exchanges and refunds.

C. Policy of the store with respect to the treatment of customers.

II. Elementary salesmanship. (1) To test the talent for salesmanship; (2) to serve as a basis for eliminating those unsuited for store work; and (3) to assist in classifying workers as stock keepers, sales persons, or office workers.

1. Salesmanship.

A. Elementary principle.

a. How to greet customers; b. how to find out customers' needs; c. how to hold the customer until a more experienced sales person can give her the attention desired; d. how to locate stock in the department; e. such elementary information about stock as prices, stock numbers, special names, or other means of identifying stock.

B. Care of stock.

a. How to dust, brush, clean, and fold stock; b. how to replace it in boxes on the shelves.

C. Demonstration sales applied to familiar miscellaneous merchandise.

a. Practice in making a sale through the demonstration.
aa. How to show the goods; bb. how to interest the customer; cc. how to meet customer's objections; dd. how to substitute merchandise; ee. closing the sale; ff. making the sales slips; gg. counting and giving the customer change.

b. Relation of counter display, store display, and advertising to selling.

2. Arithmetic.

A. Drill in the use of fundamental processes in arithmetic, fractions and decimals based on problems taken from daily routine of the store.

a. On sales slips; b. rapid drill for accuracy and speed.

B. Short methods for making computations used in the store.

C. Practical business problems in interest and profit and loss.

3. English.

A. Oral.

a. Talking about merchandise; b. repeating and giving directions; c. telephone conversation; d. talking to employers when applying in person for a position.

B. Written.

a. Business letters.

aa. Letters of inquiry; bb. answers to inquiries.

b. Short descriptions of merchandise.

C. Dictation.

a. Directions for amounts, kinds of merchandise; b. names and addresses of customers; c. short business letters.

D. Reading such literature on salesmanship and merchandising as beginners can understand.

a. Salesmanship literature; b. descriptions of merchandise and methods of manufacture; c. trade journals.

E. Spelling.

a. Words in common use; b. names of merchandise, especially the kinds that are being handled from day to day, and new merchandise; c. drill in names of streets; d. abbreviations in common use.

4. Penmanship—for legibility and speed.

5. Color and design.

A. Unity and variety as applied to merchandising.

a. Harmony of color.

aa. Matching and blending of colors in fabrics and trimmings; bb. combining colors for store displays; cc. what to avoid in showing colors to customers.

B. Study of line and space as in plaids, striped and figured goods.

C. Talks on what constitutes good taste.

D. Art vocabulary for business purposes, etc.

a. Accepted trade names for colors, etc.; b. descriptive terms as smart, chic, mode, etc.

6. Business ethics, store deportment, and citizenship.

A. Relation of employer and employee.

B. Loyalty of employer and employee—reasons for.

C. Good manners and courtesy—reasons why they are an important part of salesmanship.

D. Discussion of laws relating to store employment, school attendance and community life, in their relation to self and others.

7. Personal hygiene and health.

A. Health—a business asset.

B. Simple rules for:

a. Sleeping; b. bathing; c. exercise; d. proper food—the noon lunch.

- C. Dress—its relation to health, attractive appearance, and business.
- D. Exercises in proper sitting and standing.
- E. Recreation.
- F. Care of the teeth, nails, eyes, and hair.

8. Textiles: How to know staple fabrics.

- A. Names of cotton fabrics and drills in recognizing them. Also market prices, widths, and uses.
- B. Names of woolen fabrics, names of weaves, how to recognize them, widths, and market prices.
- C. Linen fabrics, their names, prices, weaves, widths, and uses.
- D. Instruction about one or more of the textile fibers.

III. Salesmanship and department duties. Pupils for these courses (when given in the store) should be taken from the departments having merchandise with points in common. This course is a continuation of the elementary course. Its aims are (1) to develop selling ability, (2) to give specific information about merchandise and methods of obtaining such information, (3) to give methods for learning new points about merchandise, and (4) to develop ability to meet and deal with people.

1. Salesmanship applied to specific merchandise.

- A. Demonstration sales with discussion and analysis of the principles of making a sale.
 - a. Gaining the attention; b. interest; c. desire; d. decision.
- B. Planning of demonstration sales by pupils.
- C. Suggestion in salesmanship.
- D. Care and arrangement of stock.
 - a. In the department; b. on the shelves or in boxes; c. display of stock on the counters and in the cases.
- E. Merchandise talks by buyers.
- F. Talks on advertising by advertising manager.
- G. How to cultivate customers and gain good will for the store.
- H. Relation of good health to efficient service.
- I. Personal qualifications (as expressed in manner and dress) required for successful salesmanship.
- J. Study of trade journals with reports and discussions.

2. Arithmetic.

- A. Continuation of drill as given in the previous course, if necessary.
- B. Elementary accounting and principles of bookkeeping.
- C. Personal accounts.
- D. Apportionment of personal income for:
 - a. Living; b. dress; c. savings; d. recreation; e. philanthropy and church.

3. English.

- A. Oral continuation of the work outlined in the previous course as applied to the demonstration sales and talks about merchandise.
- B. Written.
 - a. Descriptions of merchandise; b. plans for demonstration sales; c. selling talks; d. taking notes from buyers' talks and advisers' talks.

C. Reading.

- a. Keep up to date with trade journals; b. methods for manufacture of merchandise; c. current magazines and newspapers for general information; d. literature, selected classics.

4. Commercial geography.

- A. Where merchandise comes from.
- B. How shipped—freight, express, boat.
- C. Cost of transportation—freight, express, duty, and so on.
- D. Sources of raw materials.

5. Spelling.

- A. Occasional drills to keep up to date with new terms used in merchandising, in styles.

6. Color and design.

- A. Balance and accent, more advanced work in blending of colors for the sake of:
 - a. Light and dark in colored fabrics; b. how to recognize neutralized colors in fabrics; c. how to suggest warmth or coolness in color and when they are to be used for dress, furnishings, and so forth.

B. Design.

- a. Arrangement, balance, and accent.
 - aa. How to arrange trimmings or draperies.
 - 1. Regularity as in making two sides alike.
 - 2. Irregularity.
 - 3. Lines applied to trimmings or draperies.
 - bb. Value of colors in relation to their use as in dress, trimmings, and furnishings.
 - cc. Textures of fabrics and their relation to dress, trimmings, and furnishings.
 - dd. Place of color, line proportion, etc., in advertising and display work.
 - ee. Talks on what constitutes good taste.

IV. Course for assistant buyers and buyers. This course to take the form of a club of forum lectures, discussions, and debates. The following topics are suggested:

- 1. Market centers for various kinds of merchandise.
- 2. Study of merchandise.
 - A. Factors affecting merchandise.
 - a. Quality.
 - 1. Grades of raw materials.
 - 2. Mixtures used in different materials.
 - 3. Adulterations.
 - 4. Methods of finishing.
 - b. Price.
 - 1. Style.
 - 2. Quality.
 - 3. Workmanship.
 - 4. Demand.
 - 5. Transportation facilities and proximity of market.
 - B. Factors governing selection of merchandise.
 - a. Style; b. use; c. service; d. amount; e. price; f. job lots; g. discounts.

3. Supply and demand as related to merchandising.
4. Current labor conditions and problems and their effect on merchandising.
5. Store arrangement as to location of departments.
6. Department arrangement.
 - A. Methods for placing merchandise.
 - B. Shifting merchandise for seasonal demands.
 - C. Featuring stock.
7. Department management.
 - A. Policies relating to dealing with employees.
 - B. Management of stock as in planning for turnover.
8. Current legislation, especially in its bearing on store work and merchandising.
9. Lectures on commerce and business problems by authorities.
10. Textiles.
 - A. Drill in recognizing stable fabrics continued.
 - B. Drill in names, kinds, grades, widths, prices of staple and popular silks.
 - C. Study of weaves—how they are made.
 - a. Plain weave; b. basket; c. cord; d. twill; e. serge; f. brocade; g. satin; h. marquisette or scrim; i. nap.
 - D. Simple tests for wool, cotton, silk, and linen fabrics. How to know mixtures.
 - E. Such simple, practical comparisons as difference between damask and crash; serge and broadcloth; cotton twill and Indian head.
 - F. Dyes—where they come from and how made and how used.
 - G. Weighting and finishing fabrics.
 - H. Source of raw textile fibers.
 - a. How secured; b. preparation for spinning and weaving.

ADVANCED COURSE IN SALESMANSHIP for persons who have been in the store a year or more. To be conducted as class work or club work for persons selected from allied departments. The object of this course to develop a knowledge of scientific salesmanship and study of merchandise.

1. Demonstration sales with discussion and grading.
2. Discussions of such store problems as:
 1. Problems of merchandising.
 - a. Division of merchandise among departments and sales people; b. methods of keeping stock; c. plans for disposing of stock; d. featuring out-of-season stock; e. display of stock.
 2. Problems of discipline.
 - a. Teamwork in departments and in the store; b. deportment in the store, employees' codes and standards versus those of employers; c. treatment of customers.
 3. Ways of improving service.
 - a. For convenience and comfort of customers; b. for saving time and energy of employees.
 4. Required readings from trade journals and books on salesmanship, discussed or debated.
 5. Current literature, magazines, newspapers, for general information.

6. Industrial history as related to merchandise.

- a. History of source and uses of merchandise; b. evolution of manufacturing methods and the effect upon merchandise as to:

- a. Quality; b. cost; c. colors; d. design in decorative patterns.

7. Literature, selected classics.

The course in garment making, which is two years in length, is for the girls of the Girls' Vocational High School preparing for machine operating in the garment trades of the city. Attendance upon the school is for seven hours each day, five days a week, ten months each year. Half of the time is given to shop practice and half to classroom instruction. No attempt was made to arrange the shop work by years. The outline is an enumeration of the operations to be taught and the order in which they are to be taken up rather than an exposition of the method of presenting them.

2. Garment-Making Industries.

I. The machine.

- 1. Control of the machine.
 - a. Starting; b. stopping.
- 2. Care of the machine.
 - a. Oiling; b. dusting; c. cleaning (removing of lint, etc.).
- 3. Adjusting of parts.
 - a. Threading of machine; b. regulating tension; c. setting of needle; d. stitch regulating; e. care of bobbin.
- 4. Knowledge of standard machines (single needle) as described.
- 5. Adjustment and use of attachments.

II. Plain operating processes (applied to simple garments).

- 1. Plain sewing (flat).
 - a. Straight edges; b. one straight and one shaped or bias edge; c. two shaped or bias edges.
- 2. Felled seaming.
 - a. By hand; b. through hemmer; c. cover seaming (Union Special).
- 3. Hemming or facing.
 - a. Straight hems on length of cloth; b. straight hems on width of cloth; c. shaped hems (on bottom of shirts, etc.).
- 4. Short and long length stitching (as applied to the foregoing).

III. Garment making.

- 1. Pocket making.
 - a. Knowledge of parts; b. putting parts together.
- 2. Trimmings (collars, cuffs, pockets, etc.).
- 3. Sleeve making.
- 4. Sleeve setting.

IV. Special courses.

- 1. Pocket making.
 - a. Flap; b. welt; c. piped.
- 2. Button sewing and buttonhole making (machine).
- 3. Hand finishing (optional).
 - a. Hand buttonholes and eyelets; b. embroidering; c. initial making.
- 4. Cravats.
 - a. Hemming; b. seaming; c. pressing.

5. Shirt making.
 - a. Plackets; b. yoking; c. front plaiting and facing; d. collars, cuffs, and ties; e. bosom making; f. pocket making; g. sleeve making; h. assembling parts; i. two-needle seaming.
 6. Shirt-waist making (similar to shirt making).
 7. Skirt making.
 - a. Seaming; b. hemming; c. facing; d. flounce making and setting.
 8. House dresses, aprons, kimonos, etc.
 - a. seaming; b. hemming; c. gathering; d. flounce making; e. hand stitching; f. sleeve making and setting; g. trimming.
 9. Overalls and pants.
 - a. Pockets; b. flies; c. seaming, etc. (two-needle cylinder machine).
 10. Jackets.
 - a. Seaming, etc.; b. pockets; c. hemming.
 11. Mackinaws.
 - a. Sleeve making (cuffs and tabs); b. yoke, strap, and belt making; c. collar making and facing; d. pocket making; e. binding of parts; f. body making and assembling of parts; g. two-needle finishing and blind stitching.
 12. Duck coats (fur-lined).
 - a. Sleeve making and assembling of parts; b. fur linings.
 13. Bag making.
 14. Corset making.
 - a. Seaming and facing; b. stripping; c. back making (four-needle); d. clasp and fastener setting; e. hemming; f. lace sewing.
 15. Cap and hat making.
- V. General education.
1. Business arithmetic.
 2. Business English.
 3. Hygiene—health.
 4. Art applied to trade work.

COURSES FOR BOYS AND MEN.

1. Carpentry.

This course is for the day class in carpentry at the Dunwoody Institute, described in the chapters on the apprenticeship, building trades, and trade understandings (V, VI, and XXIII). The boys attend this two-year course for seven hours each day, five days a week, for ten months each year.

1. **Shopwork:** Names, uses, and care of different woodworking tools as they are called for in the work. Making the common joints with which the carpenter must be familiar. Use of the steel square. House and roof framing; scaffold building and stair building. Preparation and erection of interior trim and cabinetwork. Use, care, and adjustment of woodworking machinery such as circular and band saws, tenoning, mortising and molding machines, planers and wood lathes. Lectures on and installing of builders' hardware.
2. **Drawing:** Sketching and free-hand lettering. Construction of geometrical problems related to the trade. Orthographic and isometric projections. Building details covering construction. Working drawings. Tracing and blue printing. Building regulations, plan reading and the drawing of specifications.

3. **Applied science:** Structure and properties of various woods, strength of materials, strength of joints, girders, studding, holding power of nails, screws, bolts, and glue, a study of trusses; strength added by bridging, wind pressure on buildings, snow loads on roofs, floor loads, effects of heat and moisture on wood, protective coating such as paints, oils, and creosote; fireproofing, insulation, derricks, and hoisting machinery; action of grindstones, emery wheels, and ollstones.
4. **Mathematics:** Board measure and shop methods of measuring; areas of surfaces; cubic measure; geometrical problems involved in house framing, roof construction and stair building; the use of the steel square; use of formulas; calculation of line, quantity of material, and costs for various problems of construction and the keeping of simple accounts.
5. **English, civics, economics, and industrial history and hygiene of the trade.**

2. Bricklaying.

The work outlined is for the dull-season classes for apprentices in bricklaying to be given in January and February each year. The outline is nothing more than an enumeration of the subjects which, in the opinion of the trade, should be covered in four years of two months each. The apprentice is to attend school for seven hours a day, five days a week, during these months. No attempt has been made to arrange the subject matter by years, as it was felt that only the experience gained by the school in dealing with the problem could do this properly.

1. **Shopwork:** Mixing and spreading mortar; straight plain walls, 4-inch, 8½-inch, 13-inch, 17-inch, 21-inch, 25½-inch; same with returns and intersections; chimney tops, beehive tops, paneled tops; building in windows and doors; corbeling; bonds, stretcher, American, English, single and double; Flemish, Dutch, English cross, basket weave, heading, raking diagonal, herringbone, and hoop iron and other iron and steel bonds (short unit); arches; bow windows; casking, hot air heaters; boiler setting; fireplaces and mantels; flues; paneling and ornamental brick work; press brick fronts; cement and concrete work.
2. **Drawing:** Sketching and lettering, geometrical problems relating to the trade; bonds, arches, and cornices; fireplaces, chimney tops, elevation plan and section of fireplace and brick mantels. Details of window and door frames for brick walls; one-fourth inch scale working drawings of small brick building. Plan reading and preparation of working drawings. Working drawings consisting of one-half inch scale plans, elevations and sections of brick buildings; tracing and blue printing; building regulations, plan reading, and the making of specifications.
3. **Applied science:** Attention is to be paid in a practical way to the manufacture and composition of brick, lime, cement, and mortar; effect of acids on brick work and stone; insulation against heat, moisture, and sound; effects of weather, freezing, expansion, etc., on masonry materials; strength of materials, arches, and walls; use of builders' transit.
4. **Applied mathematics:** Calculating time, quantity of material and costs for various problems in construction. The keeping of simple accounts.

3. Cement and Concrete.

This work is to be taken up in the later years of the dull-season courses, and the student will, of course, bring to it a considerable amount of previous training in drawing, science, and mathematics.

1. **Shopwork:** The building of forms for foundations, footings, piers, steps, sidewalks, floors, blocks, slabs, columns, beams, girders, arches, and retaining

walls. Mixing different kinds of concrete, pouring and finishing of the various forms mentioned above. Reinforcing and waterproofing of concrete as applied to these forms.

2. **Drawing:** Detailing and designing of the various forms used in concrete construction. Building regulations, plan reading, and the drawing of specifications.
3. **Applied science:** Laboratory and practical arts of the materials used in the manufacture of concrete: Sand for fineness, purity, strength, and voids; stone for size, hardness, durability, abrasion, and voids; natural and manufactured cement for chemical properties, characteristics, strength and endurance, specific gravity, fineness, selling qualities, soundness; concrete for compression, sheer and tension; characteristics of steel; theory of reinforced concrete; the mechanics of structures; effect of alkalies, electrolysis, acids, and force on concrete; finishes and waterproofing; failures of concrete; history of the development and manufacture of cement and concrete.
4. **Applied mathematics:** Calculating time, quantity of material, and costs necessary in the making and erection of the various forms of concrete work. Calculating loads and carrying power of concrete construction.

4. Telephony.

The courses in this subject are evening courses for those already employed in the business. They are unit courses so arranged that the student may take any one or several of them in any one year, and in three years of study may take them all. The course in general science is to be required of all students at the start. After taking this students are permitted to elect as the next course the subject for which they feel the greatest need in their daily work and for promotion.

These courses are now being given, as outlined, in the evening school of the Dunwoody Institute. At least 80 per cent of the students enrolled for the first course have remained to continue others, while the new courses are enrolling students who are attracted by the specific subject offered. It will be noted that some subjects are given in two courses, such as primary and advanced. In such cases students are, of course, required to take the primary course first.

General science: Principles of electricity and magnetism.

I. Magnetism: Magnets—permanent, electros; magnetic circuits, calculations.

II. Ohm's law: Series circuits, parallel circuits, measurement of resistance, line drop.

III. Power equation, measurements of power.

Theory of the telephone: Sound waves, voice frequencies. This subject will be illustrated by a simple circuit showing functions of the following pieces of apparatus: Transmitter and receiver, induction coil, repeating coil, ringer and condenser.

Substation: Study of circuits. Theory of protection as applied to substation equipment. Installation methods. Ringer adjustment and troubles. Local battery: Local battery, transmitting and common battery signaling. Common battery.

Central office: Description of switchboards and their operation. This subject will be covered by starting with a simple talking circuit and adding one by one the different pieces of apparatus, showing the function of each.

Study of switchboard circuits: Their purpose and operation. Reading blue prints. Study of color code.

Switchboard maintenance: Routine testing. Clearing trouble. Relay adjustments.

Power apparatus:

IV. Generators: Shunt; series; care of commutator and brushes; troubles and corrections.

V. Motors: Shunt; series; alternating—single, two, and three phase.

VI. Ringing machines: Dynamotors; generators; interrupters.

VII. Mercury arc rectifiers: Theory; care and operation.

VIII. Batteries: Primary (chemistry of construction and uses); storage (chemistry of: Impurities in water and electrolyte, their effect on the battery); care and operation.

Test board (local): Description and purpose. Operation.

1. Testing subscriber's line, and central-office trouble.

2. New installations.

3. Breakdown test.

4. Insulation test.

Private branch exchange: Description of the different types, their uses and operation. Study of circuits, installation, battery supply, maintenance, troubles.

Cable and cable terminals: Manufacture (Mechanical requirements) (Electrical requirements). Types of cables and their uses. Types of cable terminals and their uses. Cable lapping, method of laying out. Building cabling and wiring. Construction methods, serial and underground. Splicing. Troubles, causes, methods of locating and clearing. Theory and application of protection.

Outside plant construction: Aerial, underground.

Toll plant: Discussion of types of construction. Handling and placing copper wire. Transportation schemes and method of cutting transpositions. Phantom circuits. Simplex circuits. Composite circuits. Duplex circuits. Loading. Theory—application, open wire and cable. Inductive disturbance.

Toll test boards: Description of the different types. Operation: Covering testing for and locating trouble by use of voltmeter and Wheatstone bridge. Open location test. Line insulation test.

5. Flour Mills.

The suggestions given below were drawn up by the survey and submitted to the managers of the mechanical departments of three of the largest flour mills in Minneapolis. While all of them were uncertain as to whether any plan of training for the mechanical workers of an American flour mill could be carried on successfully, they were agreed that in the absence of any precedent in America these suggestions seemed possible and presented subject matter a knowledge of all of which would be valuable to the worker seeking promotion in the milling industry.

Training by the School.

1. Open to whom:

Oilers, helpers, grinders, and bolters of the grinding and bolting departments, and to second millers and head millers. A course of lectures in 1911 at the Manchester School of Technology was attended by "screen men, milling operatives on the various machines, warehousemen, mill clerks, foremen, milling apprentices, flour salesmen, travelers, and even by provender millers."

2. When to be given:

In part-time classes; two to four hours per week to these groups:

a. Group working 8 a. m. to 4 p. m.: 4.30 to 5.30, two hours a week, four times a week; 7.30 to 9.30, one night a week; two nights a week.

b. Group working 4 p. m. to 12 p. m.: 1.30 to 3.30, one hour a week; two times a week.

c. Group working 12 p. m. to 8 a. m.: 7.30 to 9.30, one night a week; two nights a week.

3. Equipment:

In order to give instruction successfully, whether to those already in the business or those seeking preparation for it, it would be necessary to have a complete experimental mill. A laboratory and lecture room would also be required.

4. Purpose:

To give promising men in the business a chance to fit themselves for promotion and leadership on the operating side of the industry.

5. The course:

No attempt is made to list topics in their proper order or to divide up the work by years or brief courses. The outline is an enumeration of the subject matter to be taught rather than a description of the method to be used.

- I. A study of the different kinds of wheat to learn how to judge the grades of wheat.
- II. The importance of preserving color, purity, and quality of flour and how this is done through the mixing and careful work of the mill.
- III. Simple mechanical tests for gluten, starch, and so forth, in wheat.
- IV. Grading of flour both by seeing it done and by taking part in the grading.
- V. The construction of the different machines of the flour mill.
- VI. Practice in taking these machines apart, putting them together, and operating them.
- VII. Free-hand sketching of the details of these machines, making of simple drawings to scale, and reading of blue prints for flour-mill machinery.
- VIII. The adjustment and repair of the machines of a flour mill.
- IX. The analysis of mill screens to determine the advisability of changing cloths or parts.
- X. The study of power-transmission bearings, shaftings, gears, eccentric motions, and so forth.

Training by the Helper System.

The grinders and bolters of a large mill each have a helper to assist them in the work. In small plants this helper is also the oiler. Sometimes he is, in addition, the sole and joint helper of both the grinder and the bolter. Sometimes the helper is carefully taught all that the man under whom he works knows. Many, if not most, grinders and bolters, however, refuse to teach their assistants anything. Consequently the helper knows only what he has learned by chance. These subordinates would be greatly helped to obtain better positions, if not in the same plant then in others, if those over them were required to give them, in a systematic way, both instruction about the work and an opportunity to apply what they have been taught. Of course, to be of large value this arrangement should rest upon the selection of more competent helpers.

The Training of Millwrights.

It seems quite probable that most of the millwrights will continue to come from within the plant or the business. Their knowledge of the workings of the mill gained in this way is undoubtedly a large part of the necessary equip-

ment for the millwright's duties. He is a mechanic of a very important and skilled kind. For the highest efficiency, however, he needs to know, as every mechanic should know, how to make free-hand sketches to represent his ideas, read blue prints, and take off quantities correctly, figure dimension stock, and make drawings to scale. His elementary knowledge of geometry would confirm and fix his practice in the making of spouting.

Should any school in the city undertake to teach by actual demonstration work the construction and operation of milling machinery, the course should be open to millwrights, carpenters, and millwright helpers, as well as oilers, helpers, grinders, bolters, and second millers.

The Training of Flour Testers.

When young men are brought in from the outside better results would be gained in the end if they were required to have at least a high school education and preference were given to those who had taken courses in general chemistry.

One head chemist was strongly of the opinion that the flour testers could be trained in the testing rooms by the helper system. Much of this is now being done without organization and system. A course of reading in a simple elementary book on the chemistry of flour and the making of bread could readily be laid out as required study.

A list of the useful and helpful things in the chemical testing of flour could be made which it would be of great advantage for them to know, either for their present work or for the advanced position in other lines to which they are finally sent. The head chemist could arrange to have them taught by the testing chemist and checked as taught, either in a series of lessons during the routine of the work or at convenient periods, such as the noon hour and before and after the day's work.

6. Technical Course in Central High School.

The technical course which has just been established in Central High School aims to serve the needs of boys who are going out from the high school into positions on the directive and productive side of industry. A full treatment of these positions and this course is given in the section on manual training in Chapter III, in Chapter V on apprenticeship, and in Chapter XVIII on training for leadership in industry.

This course is four years in length, ten months being required each year. The usual high school day has been lengthened to seven hours for the group taking this course. An outline of the course follows:

TECHNICAL COURSE—MINNEAPOLIS CENTRAL HIGH SCHOOL—1914.

Semester.	Shop.		Drawing, two periods daily.	Laboratory, two periods daily.	Mathematics.	English.	Business.	Geography and history.	Music and gymnasium.	Periods a day.
	Weeks.	Two periods daily.								
1	5 5 10	Turning, Foundry, Forge.	Reading drawings, sketching, pencil drawings.		Algebra, commercial arithmetic, shop mathematics.	English, with penmanship and spelling.			Music and gymnasium.	7 recitation, 2 study. — 9 total.
2	20	Pattern making, use and care of machines.			Algebra, commercial arithmetic, shop mathematics.	English, penmanship, and spelling.		Geography, physical, commercial, two periods daily.	Music and gymnasium.	7 recitation, 2 study. — 9 total.
3	20	Cabinetmaking, with de-tailing, mill-wrighting.		Chemistry.	Geometry, shop mathematics.	English, oral.			Music and gymnasium.	7 recitation, 2 study. — 9 total.
4	10 5 5	Cement and concrete, painting, and carpentry.		Chemistry.	Geometry, shop mathematics.	English, oral.		History of United States and local, industrial and commercial.		7 recitation, 3 study. — 10 total.
5	15 5	Carpentry, sheet metal.		Physics.		English, salesmanship, business correspondence.		History, world, industrial and commercial.	Music and gymnasium.	7 recitation, 3 study. — 10 total.
6	15 5	Machine shop, heat treatment of metals.	Drawing.	Physics, shop mathematics.		English salesmanship, business correspondence.				7 recitation, 2 study. — 9 total.
7	20	Machine shop.	Drawing.	Power, laboratory, applied mathematics.			Business law, accounting.			7 recitation, 2 study. — 9 total.
8			Drawing.	Power, laboratory, applied mathematics.	Trigonometry elective.		Business practices.	Economics and civics.		7 recitation, 4 study. — 11 total.

Note.—Subjects black-faced require outside study.

APPENDIX D.—SUGGESTIONS FOR COURSES OF STUDY FOR PRE-VOCATIONAL CLASSES.

A. Academic work, to occupy approximately half the time of the pupil:

1. **English:** Language work, based on reading, much of it to bear upon the industries; composition, dealing with the occupational work in the school and the industries visited by the pupil; business correspondence, business forms, spelling, and the ability to interpret printed directions and to carry on business correspondence.

2. **Arithmetic:** To be of a very practical nature, including fundamental processes, short methods used in business; business and trade arithmetic, with emphasis on immediate application to the work of the industries studied in the school.

3. **Geography:** Chiefly industrial and closely related to the industries; study of transportation lines and the transportation of industrial and agricultural products; relation of geographical location to industries of the community.

4. **History:** Closely related to geography and dealing with industrial and commercial development of city, State, and country.

5. **Civic and social duties:** Relations of the individual to the community, State, and country; relation of the worker to his work, to his employer, and to his fellow man; duties and responsibilities, both civic and social, with special reference to sanitation, personal hygiene, etc.

B. Industrial work, approximately half time:

1. **Woodworking:** To consist of carpentry and cabinetmaking, including such other forms of work as may be called for by the projects undertaken; the study of tools, machines, structures such as a garage, poultry house, summer cottage; problems in framing, truss construction, and repair work, with emphasis on the latter.

2. **Metal working:** To consist of work in hot and cold bar metal; practical problems in repairs and construction which developed in the equipping of the school will supply work for some time. This will include such work as the making of braces and angle irons, bolts, machine and belt guards, simple tools, pipe cutting and threading, metal parts of electrical and other apparatus. In addition to this the student should take apart and assemble old machines, seeking to find out how they work, and why; study carefully the principles of the automatic machines and methods of transferring power through machines to the final performing of the work. The intention of this work being to familiarize the student with general principles of mechanisms, projects in the construction of hand forges, water wheels, windmills, blowers, automatic coasters, and the like will interest large groups of boys.

3. **Sheet-metal construction:** Problems involving pattern cutting, soldering, riveting, and so on, furnish excellent opportunities for instruction in principles of plane geometry.

4. **Printing and bookbinding:** Considerable work can be done with very limited equipment. The setting of type in a stick, proofing, proof reading, correcting, printing of cards, announcements, letterheads, etc., required by the school. The small weekly school paper will furnish excellent practice for English classes to receive practical instruction in English, in which they will be intensely interested. Printing furnishes an excellent opportunity for training in applied design.

5. **Electrical construction:** Consisting of elementary work in battery construction, magnetism, induction, small motor and dynamo construction, wiring, electrical measurements, and testing. Experiments with batteries, induction coils, the wiring of bells, telegraph instruments, telephones, and circuits can be worked out on specially constructed frames. The wiring of simple circuits on walls or specially constructed racks will furnish opportunity for wiring of bells, annunciators, lights, and machines.

6. **Simple construction in concrete:** To include experiments with Portland cement, the construction of devices for testing, and the casting and testing of blocks made, first of cement only, then with different proportions of sand, cement, and gravel, and finally with reinforcement. The casting of blocks, posts, etc., will lead to the casting of garden seats, troughs, flower pots, window and porch boxes. Simple ornamentation of concrete will afford excellent opportunities for the application of the study of industrial design. The building of steps, walks, walls, and the making of moldings for cylindrical casts by a process of sweeping furnishes practice for a study of typical industrial processes.

7. **Building materials:** Consisting of elementary work on such things as the mixing of mortar, the laying of brick in the simple bonds, the making of models, and application of the commercial processes of making plaster casts; the mixing of paint, harmony and taste in colors, the preparation of various surfaces for painting, and the application of paint to different surfaces.

8. **Industrial work should be supplemented by trips to shops and buildings in process of construction and the systematic discussion of things observed.**

9. **Drawing:** To be elementary in character, but practical and related directly to the projects undertaken by the pupils working in various shops.

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